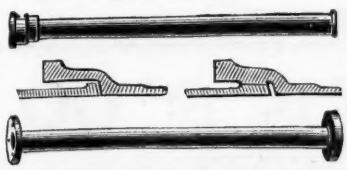
THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LXX. No. 1786.] LONDON, AUGUST 3, 1897. [49TH YEAR. PRICE 6d.

GAS AND WATER PIPES
1½ to 12 IN. BORE.



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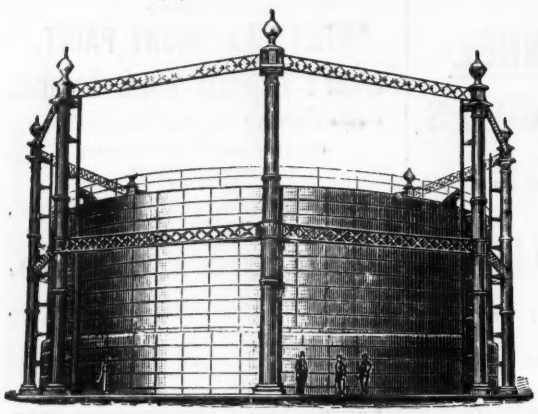

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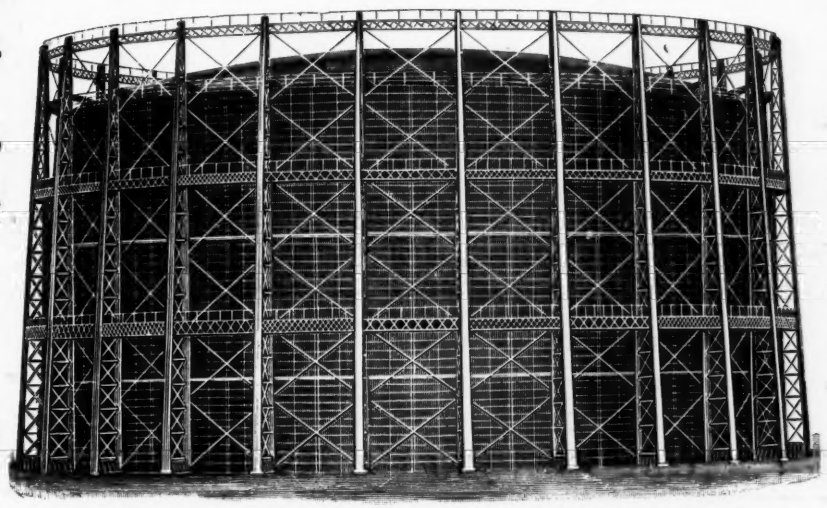

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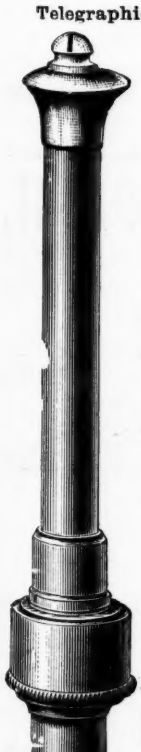

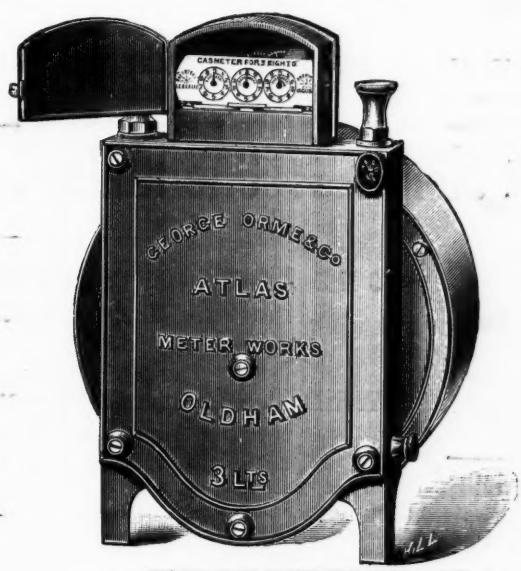

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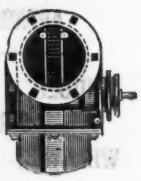

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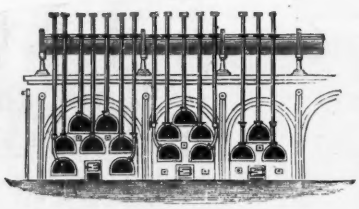

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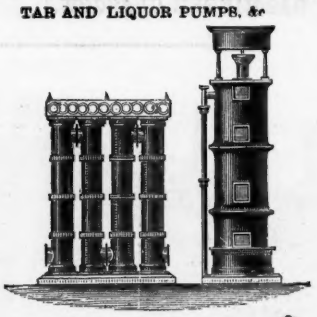

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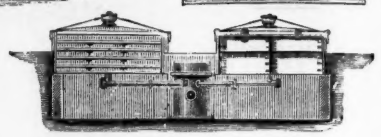

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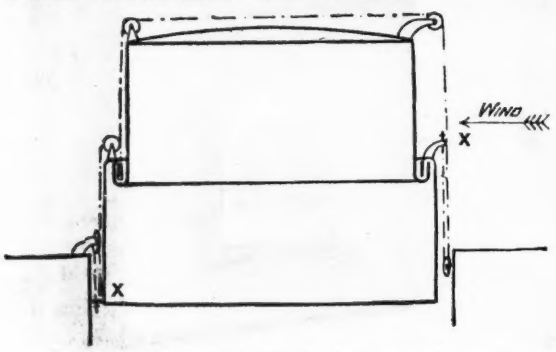

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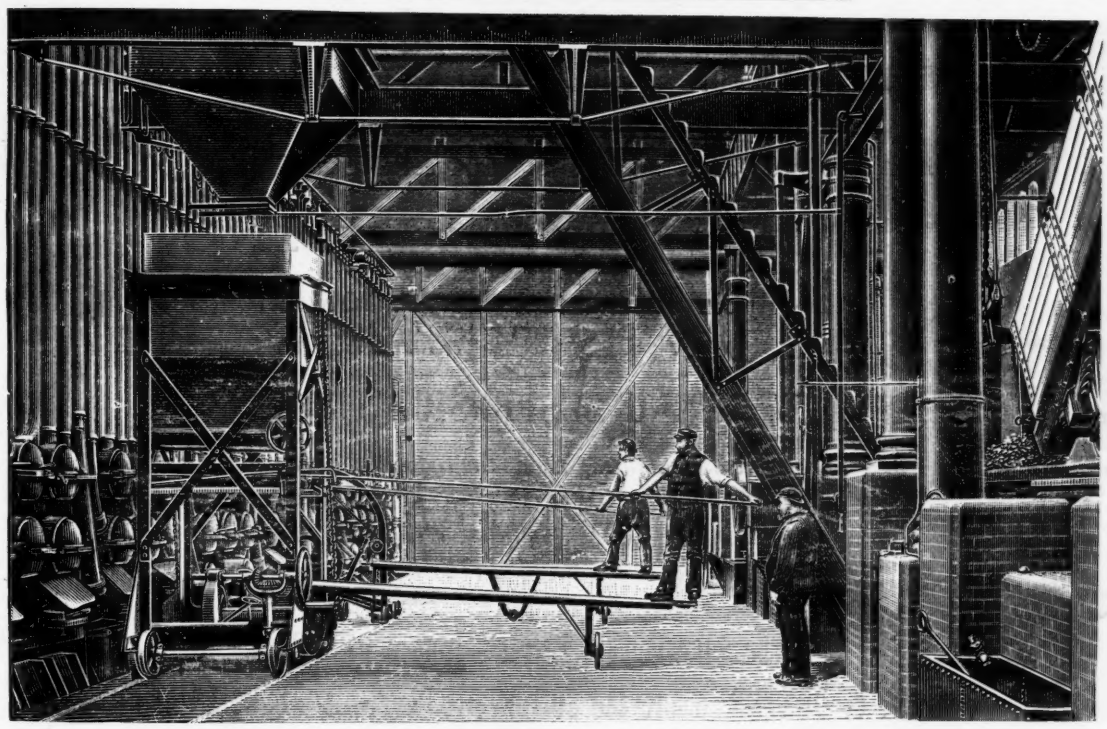

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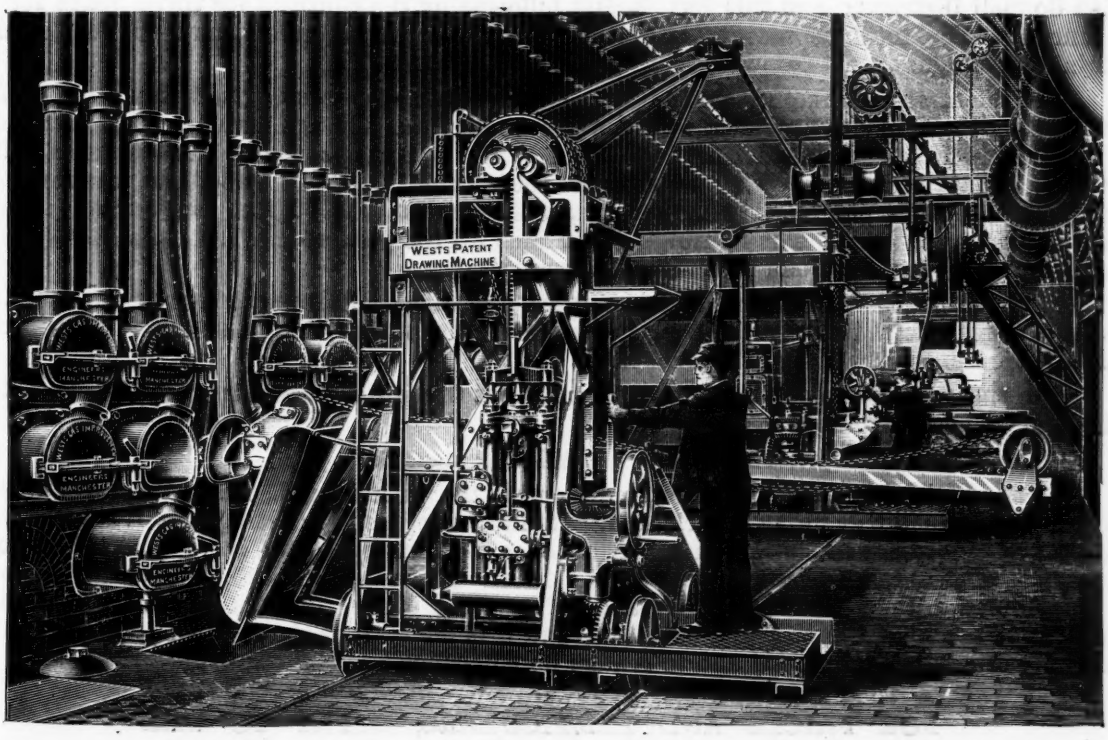

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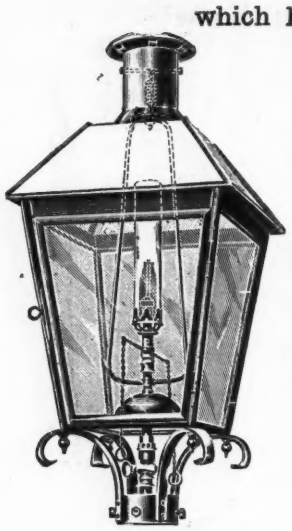

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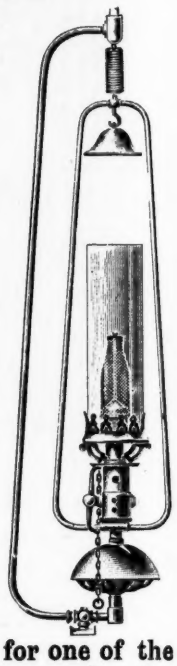
the difficulties caused by VIBRATION having been OVERCOME by the use of the

NEW SPRING SUSPENSION FRAME (Patent).

This System of Lighting meets the requirements of all Lighting Authorities in those Districts where it is desired to effect an Improvement in Street Lighting WITHOUT INCREASE OF EXPENDITURE.



The following are Extracts from a PAPER read by Mr. F. G. DEXTER, before the SOUTHERN DISTRICT ASSOCIATION.

"The success of the experimental (Welsbach) lighting secured the contract for one of the Parish Council Districts; and this was shortly followed by the contract for three years for the city lamps. The total represents altogether about 500 single lamps, and 15 refuge lamps containing two lights."

"In the matter of maintenance of the street lights, the record is favourable—in fact, more so than the estimate provided. By the test-meter, the average daily consumption works out to 38 cubic feet per light, including bye-pass. The bye-pass consumes with a flame half an inch long, $\frac{1}{6}$ foot per hour. This represents 1000 cubic feet per lamp per annum. The average consumption per light, when in use, works out to 12,900 feet per annum, or about $3\frac{3}{5}$ feet per light per hour. The lighting is continued all the year round, from the average times of one hour after sunset to one hour before sunrise."

"The mantles have worked out to an average of three per lamp per annum; but, bearing in mind the absence of frost last winter, the writer believes that four mantles per light is more likely to represent average conditions."

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"The number of lights attended to per man averages 85."

"The 'Welsbach' Light is undoubtedly one of the greatest aids to successful competition that the Gas Industry has ever experienced. Its influence, while reducing the relative cost of light, has advanced the consumption of gas all over the country by the increased satisfaction of the existing consumers, and the attraction of others. The writer feels that its influence should not be confined to the house. It is capable of meeting every competitor in the street, from cheap oils to arc lights, in cost and in effect; and it is hoped that the foregoing experience may lead many others to seek its aid and to realize its efficiency."

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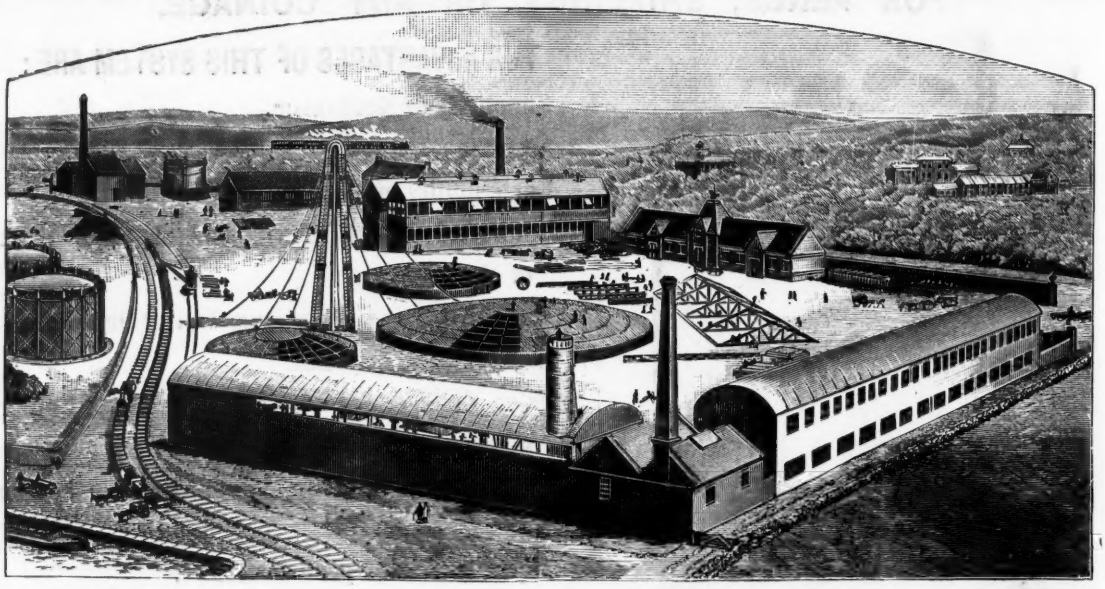

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THE IDEAL LIGHT FOR DOMESTIC USE.

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RENEWAL MANTLES 9d. each *For use on our Burners.*

THE MANTLES ARE THE STRONGEST IN THE TRADE.

"COSMO" BURNERS Complete, as shown, 12-inch Shade, 7/9 each. Price List and Terms on Application.

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OF EVERY SIZE AND DESCRIPTION.

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IT IS STRONG AND CHEAP, AND REQUIRES NO PIERS FOR ITS SUPPORT.

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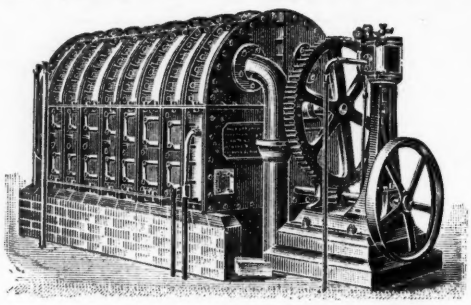

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Number of Patent "STANDARD" Washer-Scrubbers in use at this date

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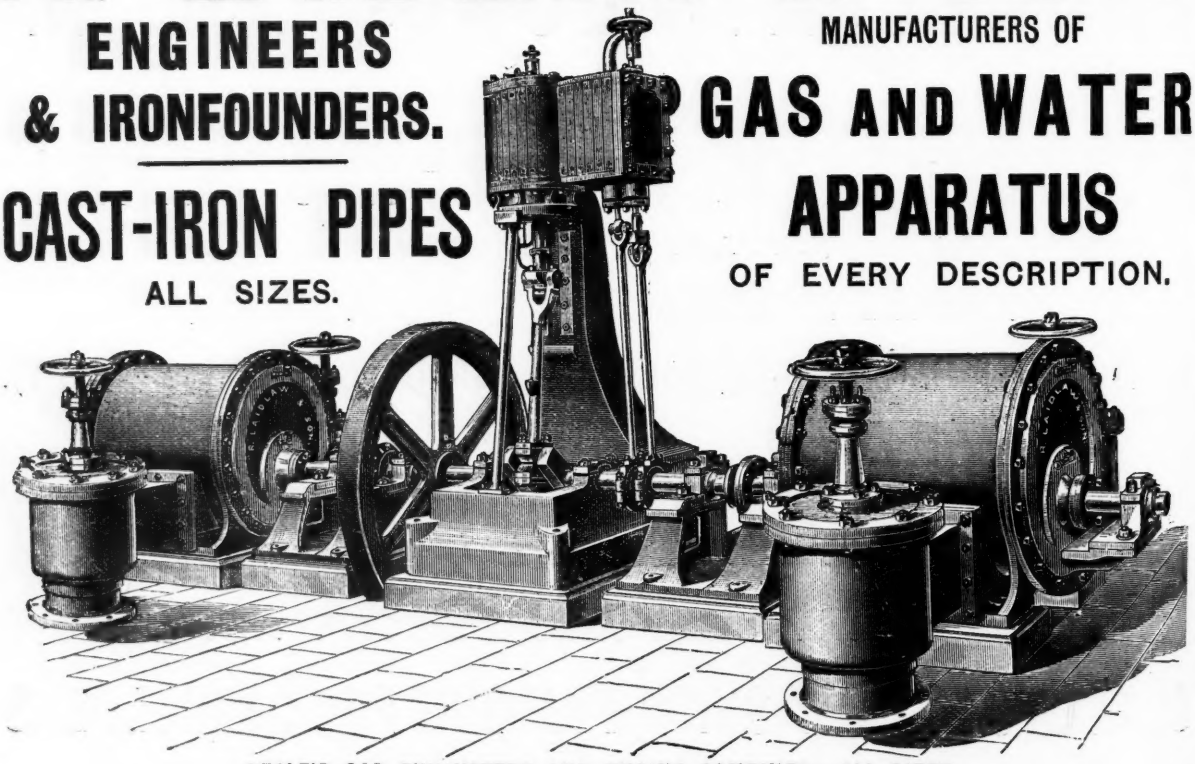

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Glasgow	300,000	Hoylake	125,000
Brussels	700,000	Shanghai	225,000
Brussels (Second Contract)	700,000	Stockport	500,000
Liverpool	3,500,000	St. Joseph, Mo.	750,000
Tottenham	750,000	Lea Bridge	350,000
Tottenham (Second Contract)	750,000	Lea Bridge (Second Contract)	350,000
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New York	1,200,000	Commercial Gas Co. (Second Contract)	850,000
Southport	750,000	Bridlington	125,000
Bath	1,000,000	Middlesbrough	1,250,000
Newburgh, N.Y.	350,000	Croydon	1,250,000
Newburgh, N.Y. (Second Contract)	250,000	L. & N.W. Railway, Crewe	700,000
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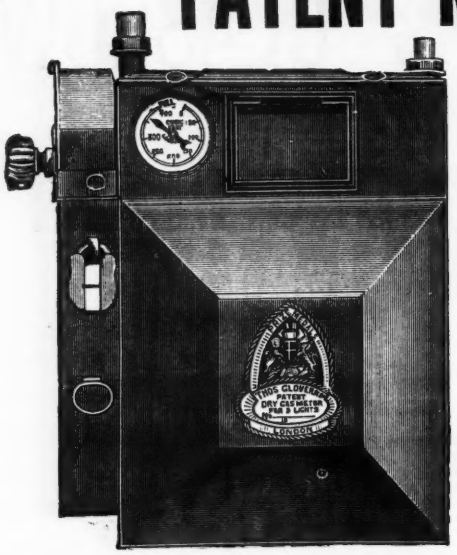

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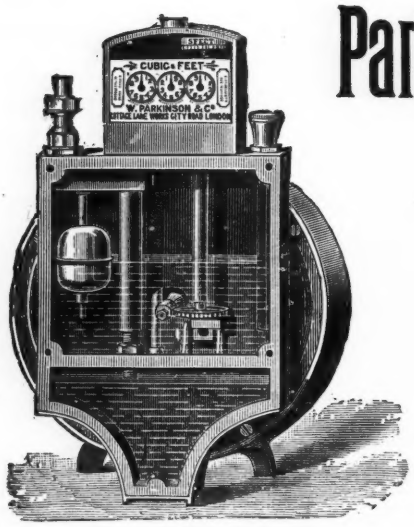

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CONTENTS.

EDITORIAL NOTES:—

GAS, LIGHTING, &c.— PAGE

The Progress of the Workmen's Compensation Bill in the Lords. 261
The Report and Accounts of The Gaslight and Coke Company . 262
The South Metropolitan Report and Accounts 263
The North British Association Meeting—The Sulphate Producers' Committee 263

WATER AND SANITARY AFFAIRS—

The Southwark and Vauxhall Water Bill in the Lords 263
The London County Council and the Water Question—The Council and the Royal Commission. 263

ESSAYS, COMMENTARIES, AND REVIEWS:—

Gas and Water Companies in the Stock Market 264
Electric Lighting Memoranda 264
Political Economists and the Workmen's Compensation Bill . . 265

TECHNICAL RECORD:—

North British Association of Gas Managers—Annual Meeting at Ayr—
Review of Proceedings 266
Inaugural Address of Mr. A. Bell. 268
British Association of Water-Works Engineers—
Mr. W. Whitaker on Some Middlesex Well Sections 270
Mr. T. N. Ritson on the Removal of the Internal Corrosion from the Mains of the Kendal Water-Works 271

REGISTER OF PATENTS:—

Gas Compressing and Pressure Regulating Incandescent Lighting Apparatus—Rothgiesser, G. 273
Automatically Lighting and Extinguishing Street and other Gas-Lamps—Blommert-Miles, E. 273
Gas-Burners—Sugg, W. T., Wright, E. S., and Mattock, W. G. H. 274
Patent Notices 274

PARLIAMENTARY INTELLIGENCE:—

House of Lords—Southwark and Vauxhall Water Bill; Progress of Bills. 274
House of Commons—Progress of Bills 275
House of Commons Committee—Tynemouth Corporation (Water) Bill 275

LEGAL INTELLIGENCE:—

Supreme Court of Judicature—Court of Appeal—South Staffordshire Water-Works Company *v.* Barrow. 275
The Incandescent Gas-Light Company's Patents 275
Question as to Laying Pipes and Wires in Montreal 275
The Settlement in the Automatic Gas-Retort Case 275

MISCELLANEOUS:—

The Combined Action among Sulphate of Ammonia Manufacturers—The Committee Formed; A Successful Start. . . . 276
The Gaslight and Coke Company—The Half-Yearly Report and Accounts 277
South Metropolitan Gas Company—The Half-Yearly Report and Accounts 278
Crystal Palace District Gas Company—The Half-Yearly Report and Accounts 279
Teignmouth Gas Supply—Annual Report on the Gas Undertaking 279
The Ashford Gas-Works Arbitration 280
Birmingham Corporation Gas Supply—Mr. Hack's Salary; Wages of the Men; The Application of the Profits. 284
Electric Lighting Notes 284
The London County Council and the Water Question—The Council and the Water Commission 285
New Water Supply for Eastbourne 285
The Daventry Town Council and the Water Supply 285
Notes from Scotland. 286
Gas and Water Companies' Stock and Share List 286
Current Sales of Gas Products 287
Coal Trade Reports. 288

PARAGRAPHS:—

PERSONAL: Mr. J. W. Schofield; Mr. A. P. Main; Mr. W. J. Dibdin 266
OBITUARY: Mr. S. Noakes; Mr. William Haslam; Alderman R. T. Eastwood 266
North of Ireland Association of Gas Managers 264
The Returns as to Gas Undertakings—Acetylene for Military Signalling 266
"Graphic Methods of Engine Design"—Belgian Briquettes . . 273
The Porthcawl District Council and Water Diviners' Fees. . . 275
Thirlmere Water for Walton-le-Dale—Newark Corporation Water Bill 279
The Proposed Purchase of the Mid-Sussex Water-Works by the Cuckfield District Council—Additional Capital for the Aldershot Gas and Water Company—The Question as to the Basis of Water-Rates at Portsmouth—Shipley Gas Company—The Crystal Palace District Gas Company's Recent Case—Sale of the Colnbrook Gas-Works 288
Reduction in Price—The Clacton-on-Sea District Council and the Water-Works—The Ossett Corporation and the Gas-Works—The London Chamber of Commerce and the Consumption of Gas—Devonport Gas Company—Cambridge Gas Company. . 289
The Rope-Guided Gasholder at Middlesbrough 290

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EDITORIAL NOTES.

The Progress of the Workmen's Compensation Bill in the Lords.

THE Workmen's Compensation Bill was in Committee in the Lords on Monday last week, when the character of the attack and defence of the measure in the Upper House exhibited several new developments. Lord Rathmore vainly moved an amendment providing that the employer shall not be liable under the Act in respect of any injury caused by the act of a stranger over whom he has no control. As originally introduced, the Bill did not make the employer responsible in case of such an accident; but the liability was extended in this sense by an amendment moved in the House of Commons, and accepted by the Government with a view to checking litigation. It is obviously to the public interest that as few loopholes as possible for disputes as to responsibility should be left under the new order of things. Lord Londonderry wished to extend from two weeks to four the period of disablement within which the employer should not be liable for compensation; but the suggestion did not find favour. A somewhat important alteration of the provision by which relief is denied to a sufferer by his own misconduct was made at the instance of the Earl of Jersey. The clause ran: "If it is proved that the accident is *solely* attributable "to the serious and wilful misconduct of the workman," and so on. The proposal was to omit the italicized word, so as to restrict the range of possible dispute; and this amendment was agreed to. This alteration of the text, however, encouraged attempts to modify it in other ways; and a weighty discussion upon the range and meaning of contributory negligence took place. The great Law Lords, scenting the prey from their safe perches, debated the point as keenly as though they had been still at the Bar. Other noble lords boggled over the idea of compensating a man for the result of an act for which he might be fined by a Magistrate. But it is impossible to read the report of this debate without experiencing an uneasy feeling that questions which so keenly interested the Law Lords are likely to engage the less disinterested attention of the humbler members of the profession.

An interesting discussion arose as to the extent of the discretion to be exercised by the Registrar of Friendly Societies in deciding upon the advantages of contracting-out schemes. What is to weigh with this important official, who will have to pass judgment upon some of the largest mutual provident schemes in existence? Is he to take account only of the nominal amount of compensation offered, or should he have regard to the collateral questions of security, and so forth? This debate brought up the great Railway Lords, who contended that the Registrar should be directed to have regard to all the circumstances of the case. This, of course, is what the workman actually does when he takes service under a particular employer. It is the contention of the Government that the Bill enables the Registrar to act on the same lines. A serious controversy sprang up over an amendment moved by the Earl of Portsmouth to omit the proviso by which the employer becomes responsible for making good the amount of compensation payable under the Act, where the funds of a mutual scheme are insufficient for the purpose. Though the Government accepted this provision in the House of Commons, they quite agreed with his Lordship's view, for reasons expressed by the Prime Minister, who argued that it was necessary for the Committees of Management of these mutual schemes to have the responsibility for their finances. He said on this head: "Whatever you do, "you must stick to this rule—that those who determine "the expenditure are the people who shall be liable to "make it good." The incident is a remarkable one; and it is pretty certain to be heard of again "in another place." The thorny subject of sub-contracting was dealt with by the adoption of a new clause making the superior employer liable in clearer terms than the original expression. There is considerable force in the observation made in several quarters that in sub-contracting will be found the chief difficulty of working the scheme. But the intention of the Bill is clear; and if trouble arises in applying the Act, it will be met in the usual way.

The Bill was put down for the third reading on Thursday, when still more tinkering had to be done to the provisions respecting sub-contractors. The Earl of Ellesmere declared the clause which dealt with this subject to be

unintelligible in the form in which it came from the Lower House. The question raised by his Lordship is of great importance to factory owners, inasmuch as it bears upon the case of workmen employed in such work as cleaning and painting. As the clause stood, if the owner of a factory contracted with a painter to paint his factory, and one of the painter's workmen fell off a ladder and injured himself, the factory owner would be liable to compensate the man. Yet if the same parties had entered into a similar kind of contract for the painting of the factory owner's private house, he would not be liable for anything that might happen to the painter's men. The Marquis of Salisbury confessed that the point was a nice one; and he considered that by no form of words that could be devised would difficulties of the kind be wholly obviated. He agreed, however, to accept the Earl of Ellesmere's amendment, as improved by Lord Herschell. The Government also agreed to postpone the coming into operation of the Act until July 1 next year, on the motion of Lord Windsor. Then, at the eleventh hour, Lord Wemyss arose and moved the rejection of the Bill in a speech that raised once more the bogeys of Socialism, undue interference with the liberty of the subject, and all the rest of it. The noble Lord spoke throughout as if the hereditary occupant of a seat in the House of Lords, rich, with an assured position, and within enormously wide limits "his own master," lived up to the same interpretation of liberty and property as the poor workman illustrates every hour of his life. The debate was lifted into a higher level by the Bishop of Winchester, who, referring to the lugubrious prognostications of Lord Wemyss, reminded the House how it has been said that "history is "amusingly careless of the reputation of prophets." The Marquis of Londonderry had a last fling at the provisions of the Bill; and the Prime Minister summed up the debate in a short speech which confessedly contained nothing new. To the objection which had been raised that the Bill is socialistic, the Premier replied that, on the contrary, it is the existing system that is socialistic, inasmuch as it throws upon the rates the charge of maintaining the sufferers from industrial accidents. To transfer the burden from the ratepayer to the industry is, in the view of Lord Salisbury, an act of natural justice. "There is," said his Lordship, "a great danger of "Socialism in the present day. It is an inclined plane "down which we are tending to move; it is a snare "which we should avoid in all our legislation. But it is "possible to cry 'Wolf' when no wolf is there; and if you "perpetually cry out 'Socialism' whenever an Act for the "benefit of the people is introduced, you do not weaken "the socialistic propaganda by so doing." There is much solid wisdom here. After an official criticism of the Bill by the Earl of Kimberley, it was read a third time by a large majority—only six peers, indeed, being found to go into the lobby against it. The House of Commons considered the Lords' amendments on Friday, and received them, on the whole, very amicably.

The Report and Accounts of The Gaslight and Coke Company.

THE half-yearly report and accounts of The Gaslight and Coke Company have been issued; and the ordinary general meeting is called for Friday next. As already announced, the profit balance on the half-year's working amounts to £366,552; and as the sum of £375,907 is required to pay the full statutory dividend of 12¾ per cent., it will be necessary to have recourse to the reserve fund for the difference, £9354. As the report observes, this fund "has "been accumulated for the purpose of equalizing the "dividends;" and so it is quite right and proper to draw upon it for the purpose. Whether there should be any necessity in the circumstances to touch the reserve in order to maintain the present dividend is another question. The report proceeds to admit the existence of an "unsatis- "factory feature" in the accounts for the half year, in the further reduction in the returns for residuals. The official apology for this condition of affairs runs as follows: "It "would appear, from the continued fall in the prices "of some of the more important of these products "during the past few years, that, for the present "at least, production has overtaken demand. It is, "however, satisfactory to observe that the excep- "tionally low prices of sulphate of ammonia which "have ruled during the past three years have stimu- "lated the demand for this material, and that it is now "being largely purchased in place of nitrate of soda." There is an air of "childlike and bland" simplicity about the conclusion of this passage. Since when, may it be asked, did purchasers of these commodities begin to divide their favours between sulphate of ammonia and nitrate of soda? The rival products have been spoiling the market for one another any time these twenty years.

The report acknowledges the pleasure the Directors feel in the well-sustained and most fortunate increase in the sale of gas. But for this happy circumstance they would indeed have had a sorry tale to tell. There is, however, much salvation for a gas undertaking in a 7 per cent. increase. More business brings need for more capital; and accordingly the proprietors are to be asked to authorize the creation and issue of £150,000 of ordinary, and £175,000 of debenture stock. A paragraph of the report makes fitting mention of the loss sustained by the Company in the death of Mr. J. O. Phillips, and announces the accession to the Board of Mr. Corbet Woodall, who will hold office until the completion of the period for which Mr. Phillips had been re-elected. The proprietors are to be heartily congratulated upon this appointment, which is to be credited to the Board as one of the wisest things they have done in recent times.

The accounts so lightly touched upon in the report do not afford very satisfactory reading, especially when tested by the predictions and promises of six months ago. The saving of the position is the increase of gas-rental from £1,387,368 to £1,483,434, or by the enormous sum of £96,066. The following entries on the credit side bear a very different aspect. Coke has dropped again from £203,815 to £190,445; tar has fallen from £87,281 to £57,748; and sulphate has gone down from £63,859 to £56,136. Some curiosity will be felt as to whether the accounts relating to coke bear out the Governor's statements at the last meeting. The half year began with a stock of 154,725 tons, the whole of which was stated to have been sold for export at 9s. 3d. per ton. This would account for £71,560 of the total receipts for coke, leaving £118,885 to represent the rest of the sales. The make of coke was 633,679 tons, and 136,648 tons are accounted for as used. This leaves a surplus of 497,031 tons of new coke for sale, whereas 528,059 tons were sold, and there is still a stock of 123,697 tons. The average return for the coke sold, less labour, works out to 7s. 3d. per ton. The value of the coke in store has been reduced from £78,811 to £46,862. There is also a heavy depreciation in the value of tar and ammoniacal liquor and products, which now stands at £133,084, as compared with £249,278.

Returning to the revenue account, it is to be remarked that more than half of the ground gained in the gas-rental is lost by the residuals. The gross revenue, therefore, has only risen from £1,761,989 to £1,809,482, or by the sum of £47,493. Upwards of one-half of this advantage is swallowed up in the increased cost of manufacture; coals alone costing £25,339 more. Manufacturing wages are also higher, and now average close on 3s. 6d. per ton. According to the observation of Mr. G. C. Trewby at the recent Engineering Conference, there is no hope whatever of reducing this charge by the more general use of machinery—or, apparently, of carburetted water gas. The gross profit was £508,713, as compared with £500,544 for the corresponding half of last year. The balance of net revenue is £366,552, inclusive of the amount of £45,747 brought forward from the previous half year; and, as already stated, the old undivided balance has gone at last, and its office is taken by the reserve fund. This fund amounted at the end of last year to £132,357; and at the rate the Company have been dipping into their accumulations during the last few years of prosperity it would not last long. It is to be supposed, however, that the magnificent rental will tell, and that the Directors will be able to regard the value of residuals with equanimity—assuming this to have "touched bottom," as the Board probably hope and believe to be the case. The proverb says that when matters are at the worst they begin to mend. But what there is in the saying that is not platitude is not always true. Things, unfortunately, when at their worst, sometimes exhibit a deplorable preference for stagnation. The only certain gleam of comfort perceptible in the Company's residual trade is that it has been brought so low that not even mismanagement can hurt it now. There will be no more "corners" in the unsaleables, nor hectoring of possible purchasers. The cement maker and

the exporter of sulphate can hold up their heads in the Horseferry Road; and the gas consumer must relinquish the hope of a reduced price. Whatever happens, people must have gas, more gas; and The Gaslight and Coke Company can be trusted to meet this demand in full—at a price.

The South Metropolitan Report and Accounts.

THE report of the Directors and principal figures of the accounts relating to the working of the South Metropolitan Gas Company appear in another part of the present issue of the "JOURNAL." There has been a 10 per cent. increase in the quantity of gas sold in the district; but, of course, the report laments the falling off in value of all residuals. The second paragraph of the report deals with the vexed question of rating, which is explained in a decidedly argumentative style. It is not made particularly clear what the Company are doing, or intend to do, in the circumstances created by the result of the last appeal; but further litigation is threatened. The report concludes with a justification of the policy of the Board in not recommending the payment of the full statutory dividends, which is as much a criticism of what goes on "in another place" as a vindication of the Old Kent Road finance. The accounts do not call for much comment. Selling gas at 2s. 3d. per 1000 cubic feet, the Company earned £495,915. The business in prepayment meters and fittings is still on the increase. Coals and other manufacturing expenses cost £382,449; carbonizing wages working out to 2s. 3d. per ton only. Profit-sharing cost the Company £18,562 for the year, of which £11,562 comes into the present account. There appears to be a considerable stock of coke and other residuals on hand. The amount of workmen's savings deposited with the Company is now £37,288, which is a very substantial sum to have been reached in so short a time. Not a word is said anywhere about the Workman-Director; but this interesting personage may be heard of at the general meeting, which is fixed for the 11th inst. It is to be desired that on the same occasion some representative of the rating authorities who are so strongly attacked in the report will attend, and give the proprietors a view of the other side of the shield.

The North British Meeting—The Sulphate Producers' Committee.

THE members of the North British Association of Gas Managers met in Ayr last week under the presidency of Mr. A. Bell, of Dalkeith, whose thoughtful address appears in another column. There was a good attendance, and a creditable amount of business was transacted. It will be remembered that the Association has been officially engaged in a praiseworthy attempt to standardize meter unions. Mr. R. S. Carlow, the Secretary, reported the progress made by the Committee of the Association in this regard; and it now appears that the matter rests for the present with the Standards Department of the Board of Trade, who intend to move at some time or other for the legalization of a standard set of unions which has been in the possession of the Department since 1888. The Councils of The Gas Institute and the Institution of Gas Engineers are to be asked to co-operate with the North British Association in stirring up the Board of Trade to more expeditious action. Three papers were read at the meeting; and we shall publish them in due course. The chief topic of Mr. Bell's address was the question of sulphate of ammonia; and it is an interesting coincidence that at the very time Mr. Bell was giving the Association his views on this subject, an important meeting of sulphate manufacturers was being held in London, at the Cannon Street Hotel. Mr. W. G. Blagden, of The Gaslight and Coke Company, was in the chair; and the result of the meeting was the formation of a new association of producers of sulphate to further the interests of the trade. The idea has been favourably received by manufacturers, who need no persuading as to the injury that is being done to sulphate by the pushing tactics of those who are interested in the sale of nitrate of soda. Whatever may be thought in a general way of the expediency of exploiting an industry in the manner followed by the Permanent Nitrate Committee, the fact of the existence and energetic working of this body is something that sulphate producers cannot afford to ignore. Colonel Sadler delivered a businesslike speech to the meeting, the burden of which was that the Sulphate Committee should devote their best endeavours, and apply whatever resources they can command, to the object of seeing that the nitrogen value of sulphate of ammonia realizes as good a price as the nitrogen value of nitrate of soda. There is nothing unhopeful in this proposal; but it cannot be denied that nitrate has secured a formidable start. There, is, moreover, any amount of money to be had for pushing nitrate; and money will have to be spent freely as well as judiciously in placing sulphate fairly before the world of consumers. It is worse than idle to complain, as some manufacturers do, of the over-production of sulphate. There is plenty of room in all countries for both nitrate and sulphate as aids to the growth of food-stuffs. We congratulate the gas industry and manufacturers of sulphate in general upon the successful issue of the April circular, and trust that the Permanent Committee will have a satisfactory career. Too much must not be expected in the beginning; but perseverance in advertisement never yet failed to beneficially influence business.

WATER AND SANITARY AFFAIRS.

IN the House of Lords on Thursday, Lord Tweedmouth, while disavowing hostility to the Bill of the Southwark and Vauxhall Water Company, expressed some apprehensions concerning it. We would observe that the Bill arises out of a peculiar state of things, and may therefore present a somewhat anomalous aspect. The Company are in the awkward position of having to furnish a supply of water from the Thames in excess of the quantity they are authorized to draw. An injunction obtained by the Conservators to prevent the Company from taking the extra quantity has been suspended for a period, to allow the introduction of the present Bill, which is temporarily to legalize the abstraction of the quantity required. But the Bill also lays the Company under the obligation to bring in another Bill next year to effect a permanent settlement. To this further stage Lord Tweedmouth objects that it will lead to an expensive contest in Parliament over a subject which will at the same time be undergoing investigation by the Royal Commission which has been lately appointed. His Lordship has suggested that the better plan would be to have the injunction suspended for a longer period—four years instead of the two proposed by the Bill—so that the proceedings in Parliament may not anticipate the decision or recommendations of the Royal Commission. But the Conservators very strongly object to any such extension of the time; and the Government sustain the objection. The Earl of Morley thinks it of importance that the Company should be bound to come to Parliament as soon as possible, and that the shortest limit of time should be given to them "to prepare the works "which will obviously be necessary in the future." Of course, this means a permanent supply from the Thames. Assuredly, whatever niceties may be introduced into this subject, nothing can lessen the wants of the Southwark and Vauxhall district; and in whatever way Parliament chooses to do it, power must be conferred so that the Company shall give the requisite supply.

At their meeting on Tuesday last, the County Council finally declared a full set of "opinions" as to the manner in which they consider the Water Question should be dealt with. For the next two months we shall hear nothing more from the Council, and London will so far be allowed to rest. In the middle of last week's discussion, the Earl of Onslow contended that the talk about the Water Question had lasted long enough; and he urged the Council to proceed at once to more important business. With regard to these "opinions," embodied in the resolutions submitted by the Water Committee, it is doubtless true that they will have very little weight with the Royal Commission. Yet the resolutions were designed for a very practical purpose, each opinion which they contained being intended "for the guidance "of witnesses." A species of brief is thus provided; and the witnesses produced will be expected to support it. The evidence is to show that the water supply should not continue in the hands of private Companies; and that the undertakings of the Companies should be purchased "at the fair "and reasonable value of the same," regard being had to certain circumstances, including the "obligations of the "Companies," on which we presume particular stress will be laid. It is also to be shown that the management of

the water supply should be effected by the Council supplying their own area directly, and selling water in bulk to outside authorities; or else by the Council taking care of their own area only, leaving the outside authorities to supply their respective areas themselves. Another alternative was proposed by the Water Committee, suggesting that the plan adopted might be that of a new body supplying directly the whole area both within and beyond the Administrative County. But when the question came before the Council, the Progressives refused to contemplate the possibility of a "new body" taking complete possession. It was when the discussion reached this point that Lord Onslow suggested the desirability of proceeding to the next business. His Lordship also signified that the Moderates intended to show their disapproval of the proceedings by taking no further part in the debate. The Progressives then had it all their own way; and all the resolutions recommended by the Committee were adopted, except the one with respect to a "new body," such as might be supposed to resemble the Water Board proposed by Lord James of Hereford. The other resolutions proposed that in any case the County Council should, in the first instance, be the purchasing authority "on behalf of "the population of the whole area concerned." The last resolution specified that if the undertakings were not acquired, the law affecting the position of the Companies should be amended, and effective powers of control should be given to the Council.

Such is the position which the Council intend to assume before the Royal Commissioners on the Metropolitan Water Supply. The Water Committee have already sent in a preliminary table, described as showing the various matters connected with the subject on which the Council would be able to give evidence. But the Committee state that this table has been so drafted as merely to present facts, "and not to put forward opinions upon "policy." These "opinions" will come in evidence, and it is already announced that, though the Commissioners are now engaged in obtaining information upon the subject of their inquiry—perhaps we might say "reading up" for it—they will not hold any sittings for the reception of evidence until after the recess. The County Council intend that the evidence to be given by the Comptroller (Mr. H. E. Haward) shall include figures to show what would have been the financial effects had the agreements come to by the late Mr. E. J. Smith in 1880 been carried out. The Water Committee say that the question of Stock Exchange value of the Companies' undertakings will be treated of, and the fluctuations in the market price will be cited as showing that "these values cannot afford "a satisfactory basis of purchase." Not "satisfactory," perhaps, to the Council, however fair to the shareholder. We thus meet with the old device, and find the Council persisting in their original intention of getting the property for less than it is really worth. The Water Committee, in sketching out the evidence to be given by witnesses already named, say they shall intimate to the Commission that the information so afforded only extends to a portion of the question of the London Water Supply. For the completion of what we may call the County Council case, other witnesses will have to be brought forward, not as yet announced. It is very clear that while the Council advocate one view of the subject, the Water Companies will have to present another. Sundry local authorities, at least in the outer area, will also claim to be heard; and the Commissioners will assuredly have a weighty task. The probability is that they will not have finished their inquiry by the time there is another election to the County Council. Should a change of "opinions" then take place, other witnesses will be wanted. If the Water Question destroyed a Cabinet, it may perchance seriously affect a County Council.

North of Ireland Association of Gas Managers.—The annual meeting of this Association will take place in Omagh next Tuesday. The President (Mr. M. Martin, of Drogheda) being unable to undertake the duties of the office, they will be discharged by the Vice-President (Mr. J. Nisbet, of Portadown). We learn from the Hon. Secretary (Mr. J. Whimster, of Armagh) that only one paper, on "Hydraulic Mains," has been submitted in competition for the medals offered by the Association. This and a communication by Mr. Outon, on his acetylene gas plant, with a lecture on "Carburetted Water Gas," by Professor Ivison Macadam, will constitute the business. Arrangements have been made for an excursion to Enniskillen.

ESSAYS, COMMENTARIES, AND REVIEWS.

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 286.)

In spite of being sandwiched in between two short holiday periods, the week just finished was a great deal brighter for the Stock Markets than a good many have recently been, though more favourably circumstanced as regards uninterruption to business. Opening firm but quiet, it soon showed a marked tendency to improve; and several important departments had a much better time. South Africans picked up, Americans did the like, while their Canadian neighbour got a fillip from expectations raised by the new gold discoveries. With a good tone thus early set, almost everything profited to some extent. On the settlement being concluded, business fell very quiet, and is not likely to be very quick in reviving again after the Bank Holiday on Monday. The Money Market remains in about the same condition as it was a week ago. Business in Gas was very fair, considering the season; and prices ruled steady throughout the list. Wherever there was any change at all in values, the variations were all for the better. Most of the chief issues were quite steady and unaltered. In Gaslights, the "A" was pretty active; and every day the price kept steadily to the opening quotation—never ranging far from 315½, at which figure it repeatedly changed hands. Only a few bargains were marked in the secured issues; and the prices realized gave no indication of any disposition to move. South Metropolitan again had a small advance; and business was done at 149. Very little was done in Commercials; and the quotation did not move. The Suburban and Provincial contingent was hardly touched; but a couple of Brentford issues pushed up a little higher. The Continental group had moderate business; and beyond showing steadiness, they made no noteworthy sign. Of the rest, a small advance was marked in Cape Town and Monte Video. The Water Companies were rather more lively in the earlier part of the week; but they soon grew quiet. The tone was steady, and hardly any change was effected.

The daily operations need hardly be detailed; prices being so remarkably steady throughout the week. In brief, on Monday, South Metropolitan Gas and Southwark Water 7½ per cents. rose 1. On Tuesday, Brentford debenture advanced 2; and Monte Video and Cape Town debenture, ½ each. In Water, the quotation of East London 3 per cent. debenture was drawn in finer. There was no change on Wednesday. On Thursday, Brentford old rose. The Stock Exchange was closed on Saturday.

ELECTRIC LIGHTING MEMORANDA.

Public Lighting by Electricity—The Lighting of the Victoria Embankment—A Hollow Scheme—The London County Council's Predilection for the Obsolete.

The subject of public lighting, once the sheet-anchor of electric lighting enterprise, has lately been publicly discussed once more, under conditions and in circumstances widely different from those prevailing when the early arc lights first flashed their supposititious "2000-candle power" rays upon a dazzled public. The revived discussion has partaken of the two forms of the academical and the practical. The latter description attaches to the proceedings of the London County Council in regard to the lighting of the Thames Embankment. This is an old project, which has been reported upon and referred back and otherwise dawdled over by the County Council for years. While these dilatory proceedings have been dragging along, the introduction of the incandescent gas lighting system into street-lamps has effected a serious disturbance of the old conditions, and the partisans of electric lighting in the County Council have been compelled to recognize the new agency. How they have fared is made manifest in the report of the Highways Committee which we published on the 20th ult. This was dead against the advisability of improving the gas lighting of the Embankment by the substitution of incandescent burners for those actually in use, and fell back upon the old recommendation that the County Council should lay down a special arc lighting plant, at an estimated cost of £22,000 and annual charge of £2700 to light the roadway, but not the ornamental gardens, and the two bridges—Westminster and Waterloo. The present gas lighting costs £1300 a year, including everything; and not even the Committee could find that the change to the incandescent gas system would cost any more. It is as well to take note of these figures, in view of the incessant attempts of the electricians and their friends to persuade people that public electric street lighting can be done, even without a profit, at the same price as gas. We are not now talking of illuminating power, which is another matter, but merely of the cost of the service to the ratepayers.

The presentation of the Committee's report was followed by a discussion, the character of which proves very plainly that there is still much more prejudice than knowledge in the minds of those members of the Council who are charged with this business. It must have come as an unpleasant shock to most of our readers that the Committee, on the advice of their officers, could venture at this time of day to pronounce the incandescent gas street-lamp a failure. Naturally, the statement

was pounced upon with much delight in electrical circles; and the "Electrician" rushed out a congratulatory editorial notice, observing how satisfactory it was "that the County Council has not been deluded into making futile experiments with inadequate systems of gas lighting," and opining that "all who desire to see our streets properly and efficiently lighted will be glad to hear that every Vestry which has been wasting its ratepayers' money on experimenting with incandescent gas lighting has abandoned this utterly unsuitable system of street illumination." If this statement is meant to imply that the application of the incandescent gas system to street-lamps is generally a failure, and is being relinquished on this account, it is false; and it is difficult to believe that the writer himself can have credited it. How completely it is at variance with easily ascertainable and verifiable facts the letter of Mr. L. de Fonblanque, in our issue of the 20th ult., sufficiently shows. Very many of our readers engaged in the work of distributing gas could testify that in scores of localities the incandescent gas-lamp has simply killed the prospects of electric lighting.

The recommendation of the Highways Committee was accepted in principle by the Council. There is nothing serious in this, inasmuch as the Council have passed similar resolutions before; but there has always been a difficulty when it came to the details. So it was in this instance. The formal acceptance of the Committee's recommendation on the 13th ult. was subject to the proviso that further information should be given, at the next Council meeting, respecting the details of the scheme. An attempt to satisfy this requirement was duly made in the *agenda* for the 20th ult., which contained the explanation that the generating station would have to be built on a site adjacent to the Charing Cross railway bridge. It was intended to put in "three units" for generating the current to supply the 90 lamps provided for in the scheme; and it also came out that it was not proposed to interfere in any way with the gas-lamps on the parapet. Lord Mountmorres gave notice of opposition to this communication, discussion on which was consequently postponed until last Tuesday. When the matter was reached, his Lordship inquired whether "the row of small gas-lamps on the wall of the Embankment, which he thought made one of the prettiest sights in London at night, would still be lit." In reply, Earl Russell, the Chairman of the Committee, said he "believed the lamps would be retained; but he could not be certain." After this confession of the Committee's lack of grip of the situation, it was inevitable that the report should be once more referred back; which was accordingly done—Mr. Dickinson observing that the Council should not hurry the matter. He also said—and his warning must have gone home—that, "if the present scheme was carried out, he felt certain the Council would regret it." Most people would think the same, upon the evidence.

Our electrical contemporaries must perceive that the cause of electric lighting, which they are justly concerned to advance by all legitimate means, is not served by such futile counsels as those that seem to sway the Highways Committee of the London County Council. There appear to be influences at work upon this Committee to force electric lighting, by hook or by crook, into the finest thoroughfare in London, regardless of every other consideration. Somebody is bent upon carrying this point, and, moreover, upon carrying it in a particular way. The electricity required for the purpose must be generated in special works installed for the purpose, which it is estimated will do the work at about the same charge—£30 per lamp—as one of the public supply companies would ask. Obviously, under the former condition there would be no sort of guarantee of the soundness of the estimate or the efficiency of the service. It is not a question only of the competence of gas lighting in any form to satisfy the requirements of the case; but also of the trustworthiness of the Committee's own plans for performing the service in another way. The "Electrician" talks about the wisdom of the County Council in electing to disestablish gas—albeit not much of it—on the Embankment, in favour of electricity; while in the same issue publicity is given to a statement by Mr. H. L. P. Boot, the Borough Electric Lighting Engineer of Tunbridge Wells, that the separate system of generation recommended by the Highways Committee is open to "very grave objections," and has every chance of "becoming obsolete." It is the same old scheme that has haunted the County Council for years.

POLITICAL ECONOMISTS AND THE WORKMEN'S COMPENSATION BILL.

THE aspiration frequently formulated in these columns, that the accredited professors of the science of Political Economy would venture out of their learned aloofness from the preoccupations of ordinary citizens, and shed the light of their cultivated intellects upon the questions that perplex ratepayers and voters, bids fair to be satisfied by the public-spirited managers of the London School of Economics. Recently, under the auspices of this establishment, Mr. C. A. Montague Barlow, of King's College, Cambridge, delivered a lecture before a large audience, with Lord Reay in the chair, on the Workmen's Compensation Bill. It would be ungrateful to pass over this interesting incident—the first of its kind, we believe, upon record. Mr. Barlow, whose address has been summarized in "Engineering," did not trouble himself to argue whether the Bill is or is not a piece of Socialistic legislation. He began by quoting the scriptural query: "Who goeth a warfare at his own cost?" explaining that the expectation of the soldier is to be pensioned in case of his being disabled on the field of battle. The workman engaged in a hazardous employment is like the soldier, in respect of his having to run a greater personal risk than the ordinary citizen. The reality of this extra risk is proved by official statistics. According to the Board of Trade returns and the Registrar-General's figures, it appears reasonable to estimate that there are in this country 27,000 grave accidents every year arising from industrial causes. This is an indication of the amount of personal injury and loss that the community has actually to bear somehow under existing conditions.

The lecturer showed that the idea expressed in the term "industrial accident" is only twenty years old. Originally a master was in no way responsible for the acts of his servant, even though these might be supposed to be directed in his interest. In the seventeenth century, the Courts began to admit the responsibility of the employer for the actions of those in his service and executing his work. The doctrine of common employment, of which so much has been heard of late, was framed in 1837; and according to this development of Judge-made law, a servant was supposed to accept the risk of accidents caused by his fellows in the employment, and was held to be debarred from recovering compensation. In 1880, an Act was passed with the object of modifying the doctrine of common employment under specified conditions, but subject to the operation of an exception for contributory negligence. The result has been disappointing. Broadly speaking, it has only answered for a man to claim compensation when the injury was grave, and when he has been prepared to leave the employment. The sum obtainable was limited to three years' average wage; and the law costs were usually heavy. In the case of children and poorly-paid work-people, it was not worth while to prosecute a claim. Incidentally, we may remark that this condition of affairs gave a considerable advantage to the new Trade Unions of unskilled workers, who were able to manufacture some capital out of their defensive proceedings under the Act. Still, the law has not operated well; and nobody but the insurance offices benefited by it. "The secretary of an insurance society had stated that out of 100 accidents reported to them as likely to bring claims, no notice had been served in 85 cases, 11 cases were compounded, 3 per cent. were fought, of which one-half were won and one-half lost. In the County Courts there have been 2509 actions under the Act since 1891; and the average compensation awarded has been £41 13s.—the costs amounting to three times as much." After this, having regard to Mr. Barlow's estimate of the number of accidents, there is little more to be said about the old law.

From the English law, Mr. Barlow naturally turned to survey what is being done elsewhere; and he briefly reviewed the German legislation on the subject, and explained its working. The plea of contributory negligence is unknown; and after ten years' experience, the system is declared to be favoured by all parties. "It was found that the industrial peace produced was worth the price paid for it. No one wanted to go back to the old litigation and wrangling; and the gradual extension of the system showed that it was developing on natural lines. The specially good points were the mixed boards of masters and men and the local autonomy of the associations." This is a somewhat optimistic view of the facts; and the conclusion advanced is subject to the qualification that the German system costs a good deal to work.

Mr. Barlow gave a synopsis of the English Bill, upon the provisions of which he offered several shrewd criticisms. One of these curiously anticipates the point of the letter of Mr. George Livesey in our last issue on the accident fund of the South Metropolitan Company. Upon the question of debarring a claim for compensation when the accident is the consequence of wilful disobedience on the part of the perpetrator and sufferer, Mr. Barlow instances the case of a miner who opens his safety lamp and causes a mine explosion. His widow would have no claim upon the mineowner; but this might open up many legal questions as to responsibility for the state of things that caused the explosion. By way of comment upon this criticism comes Mr. Livesey's statement that even cases of gross negligence can be more equitably, and at the same time prudently, treated. The great *desideratum* is, in short, not to make martyrs, or to grant facilities for the presentation of those "hard cases" which are so apt to make "bad law."

With regard to the limitation of the scope of the Bill, Mr. Barlow offers an eminently sensible remark. It will embrace one-half of the labouring population of the kingdom; and if successful, it can easily be extended. If not successful, the smaller its scope the better. Upon the subject of contracting out, the lecturer laid stress on the consideration that masters could only avoid the scheme of the Bill by joining the men in some arrangement by which the latter would receive better treatment than that provided by it. "In fact, they must step out of the legal frying-pan into the co-operative fire." It was pointed out that the arbitrator is left with a considerable amount of work to do, and that a good deal will depend upon the spirit in which the provisions are interpreted.

Mr. Lewis having argued in the newspapers that men engaged

in hazardous callings actually receive compensation for their risk in the form of higher wages, Mr. Barlow discussed the point, and decided it to the contrary. Mill had considered this matter years ago, and concluded that it is pure necessity that calls men into these risky employments, and that they cannot dictate to their masters respecting wages. With regard to the cost of the working of the new law, Mr. Barlow cited German experience to prove that in coal mines—the crucial case—compensation amounts to 1·6 per cent. of the wages paid. Here the Government calculation is that it will amount to 1·5 per cent. Mr. Seaton Carr has estimated the annual bill for death and disablement in the coal mining industry at £14,000 per 100,000 men employed; which works out to 2½d. or 2¾d. per ton raised. "Since 1886, there had been an increase of miners' wages ranging from 3¾ per cent. in Northumberland to 30 per cent. in Lancashire and Yorkshire, and the coalowners had survived; so that the lecturer did not think they would be ruined by a 2 per cent. insurance." Outside the coal mining industry there is no serious question as to the cost of working the scheme; the rate of insurance for the engineering trade not being more than 0·12 per cent., according to Mr. Richardson. It is as well to have these figures on record.

Altogether, though it can hardly be said with truth that Mr. Barlow, as an academic economist, advanced very much that was novel in the way of criticism of the Bill, he succeeded at least in demonstrating that there is no theoretical objection to any of its provisions. He talked neither of Individualism nor of Socialism in connection with the measure, but treated it upon its merits in a method so fair and lucid as to earn the encomiums of the Chairman and Mr. Emerson Bainbridge. What a striking combination do these names indicate, and how much more they promise! It is not too much to hope that, after the colliery owner and the professor of political economy have done taking counsel together over the Bill, they may unite with the workers in the endeavour to make the best of the Act.

PERSONAL.

Mr. J. W. Schofield, the Water Engineer of the Huddersfield Corporation, has recently had his salary raised by £50 per annum.

The Committee of the Universal Cookery and Food Association have awarded a jubilee gold medal to Mr. Archibald P. Main, of Messrs. R. & A. Main, Limited, for his services as Chairman of the Jury at the recent Cookery and Food Exhibition in Niagara Hall, Westminster.

It may be remembered that a few months ago Mr. W. J. Dibdin, F.I.C., F.C.S., resigned his position as Chemist and Superintending Gas Examiner to the London County Council, in order to be free to undertake private practice. The engagement was to have terminated at the close of June; but Mr. Dibdin remains in office till the end of October. The Council have advertised for a successor to Mr. Dibdin, at £100 a year lower salary.

OBITUARY.

The death has recently taken place of Mr. S. Noakes, one of the promoters and original Directors of the Colne Valley Water Company.

We have to record the death of Mr. William Haslam, who up to the last few years was Managing-Director of the Holbeach Gas Company, in which he was also one of the largest shareholders. The deceased was 67 years of age.

The death is announced, at the early age of 47, of Alderman R. T. Eastwood, the Chairman of the Blackburn Corporation Water Committee. The deceased had not been in the best of health for some weeks; but only two or three days previous to his death, he was able to join in the annual visit to the waterworks. The suddenness of his end created a very painful feeling among the townspeople, by whom he was much esteemed. His career had been an interesting one; he having, unassisted by fortune, made his way from the humblest position to the highest it was in the power of his fellow-townsmen to bestow upon him.

The Returns as to Gas Undertakings.—In the House of Commons last Thursday, the returns relating to the gas undertakings of the United Kingdom, for the year ending Dec. 31, 1896, in the case of the Companies, and March 25, 1897, in that of the Local Authorities, were presented, and ordered to be printed.

Acetylene for Military Signalling.—Mr. A. E. Munby, writing to "Nature," states that, in conjunction with Captain J. E. S. Moore, he has been making some experiments on the use of acetylene in signalling lamps. He says they have obtained such good results with the very primitive apparatus at present employed, the light is so brilliant, and the requirements so portable, that it seems well worth considering whether acetylene could not take the place of the limelight where portability is an object. He describes the apparatus.

TECHNICAL RECORD.

NORTH BRITISH ASSOCIATION OF GAS MANAGERS.

Review of Proceedings at the Annual Meeting.

The Thirty-sixth Annual Meeting of the North British Association of Gas Managers, which was held last week at Ayr, was noteworthy in respect of the numbers who attended it. It is the latest illustration of the fondness which Scotsmen have for the memory of their National Poet that the meeting of the Association in the Land of Burns should bring out such a large gathering. The attendance included a representative, in the person of Mr. Thomson, of as distant a place as Inverness; and it was a pleasure to meet Mr. T. Frizelle, the Manager at Holywood, near Belfast, and the Secretary of his Company (Mr. J. H. Barrett) at the meeting. The opening proceedings consisted of a welcome by Mr. R. M'Vicar, the Chairman of the Newton-on-Ayr Gas Company, and Mr. Young, the Vice-Chairman of the Ayr Gas Company, who were most kind in their solicitations for the enjoyment of the visitors. It is a pleasant feature of these two Companies that, interlocked as they are, especially in the matter of the public lighting, they work harmoniously together, and may be said, in the words of "Tam o' Shanter," to love each other "as verra brithers." This effect is doubtless largely due to the influence of the respective Managers of the Companies, Mr. W. Smith, of Ayr, and Mr. J. Henderson, of Newton-on-Ayr. The Secretary of the Association (Mr. R. S. Carlow, of Arbroath) was able to present a satisfactory report by the Committee on all subjects except that of the standard meter unions, with respect to which there turns out to be a sort of competition between the Association and the Board of Trade—both parties having prepared standards. An effort is to be made to enlist the sympathies of the kindred associations in England in the interest of the standards which have been prepared for the Association, and which are now the property of the meter makers in Edinburgh. As between the two, the feeling should be in favour of the Association's couplings, because the Board of Trade kept theirs in secret for ten years, and only divulged their existence when they saw that they were likely to be superseded. The report on the membership showed an increase of three—not a large number, but still sufficient to indicate a flowing tide. The various funds of the Association were also shown to be in a very healthy state. As regards the Murdoch Memorial Fund, the object of which has now been practically accomplished, there was communicated the interesting information that the Committee are in a position which enables them to furnish every member with a copy of the booklet, "Light Without a Wick," which contains an account of the life of Murdoch, and along with which is to be bound up the reports which appeared in the "Journal" of the unveiling of the bust of Murdoch by Lord Kelvin in the Wallace Monument at Stirling, on the occasion of the meeting of the Association there in 1892, and also the report of the handing over of the gas-engine to Glasgow University at the end of last year. In addition, several copies of the work are to be presented to every free library in the United Kingdom. The President's address contained a strong passage upon sulphate of ammonia, which is worthy not only of perusal, but of circulation more widely than it is likely to get in the technical journals. Mr. Bell, it may be said, discharged the duties of the chair in a most efficient manner. The three papers on the programme were not of outstanding importance; but they each brought out a good deal of what the President described as rather conversation than discussion. There were no serious questions to discuss; but everything which was brought up was of a practical nature, which, after all, is as much the object of the Association as the bringing forward of new and large schemes or discoveries.

It only remains to be said that the evening excursion to famous scenes connected with the memory of Burns was a unique success. Nothing finer has ever been experienced by the members. The sail on Friday was also most enjoyable. On both days the weather was favourable, being, while very mild, not too bright to be uncomfortable.

Report of Proceedings.

The Thirty-sixth Annual Meeting of the North British Association of Gas Managers was held in the Council Chambers, Ayr, last Thursday—Mr. A. Bell, sen., of Dalkeith, the President, in the chair. The attractions of the Land of Burns were sufficient to bring out a gathering of members much larger than is usually the case at meetings of the Association out of Edinburgh or Glasgow. The proceedings were somewhat late in beginning, on account of the non-arrival of the representatives of the local Gas Companies, who were expected to attend for the purpose of giving a formal welcome.

Welcome to the Association.

The President said he was sure the members were all highly pleased to see such a large turn-out. As they knew, it was an experiment to come so far west with their meeting, and probably

a number would arrive later. They had present the Chairman of the Newton-on-Ayr Gas Company (Mr. R. M'Vicar) and the Vice-Chairman of the Ayr Gas Company (Mr. W. Young), who had kindly come to bid them welcome to the old town of Ayr. He was sure he had their permission to say they would be pleased if the gentlemen remained with them and joined in their business; but it might best suit their engagements if he called upon them first.

Mr. M'Vicar said he should have preferred that his colleague, Mr. Young, had led off; but he might just say that they were exceedingly pleased to have the meeting of the Association in their ancient town—the Royal Burgh of Ayr. He might explain, in passing, that Ayr and Newton-on-Ayr were one town. Though there were two Gas Companies, the town was all under one administration. He hoped the visit would turn out a very great success. This was the wish of both his colleague and himself. He was glad to see, from their publications and otherwise, that the gas industry was a progressing concern. Everywhere it seemed to be, he might say, on the "boom," notwithstanding the introduction of the electric light. They had that light introduced into the town of Ayr, about a year and a half ago, and a good many thought that the result would be disastrous to the Gas Companies. Fortunately—at least, so far—this had not been the case. They were still progressing; and, he thought, confidence was being gradually restored in the gas industry, and the belief was growing that the electric light would not permanently injure, but rather benefit them, in this way—that the people were wishing more light. Another result was that the Gas Companies were endeavouring to promote the use of gas for cooking and heating purposes, and thereby they hoped the consumption of gas would be increased during the daytime, which was a very material point with idle plant. He might again say that they were exceedingly pleased to have that important meeting in their town; and he hoped the members would all be satisfied with their visit.

The President said he was sure they were all deeply obliged to the Chairman of the Newton-on-Ayr Gas Company for his hearty welcome, and for his kind offer to drive them to some of the local shrines dear to the heart of every Scotsman. He proposed a hearty vote of thanks to the two gentlemen for coming there that morning.

The proposition was cordially adopted.

Report of the Committee.

The Secretary (Mr. R. S. Carlow, of Arbroath) read the report of the Committee. In the course thereof they stated as follows:—

The Benevolent Fund in connection with our Association has been drawn upon to the large extent of £40; three sums having been paid to three deserving cases. The annual report of the proceedings of 1896 was published and sent to each member of the Association, according to the rules. The Statistical Report for the year ending July 31, 1896, was compiled and bound with the Annual Report of Proceedings for 1896.

Following up the report of the Research Committee submitted and approved at the last annual meeting, the Committee resolved that the set of standard unions should be deposited with Mr. John Jack, Gas-Meter Inspectors' Office, Edinburgh. This was done; the cost of the same being defrayed mutually by the meter makers of Edinburgh, whose property they now are. The meter makers were fully prepared to supply unions to the standard sizes; but your Committee, on lodging the standards with Mr. Jack, were informed that some days ago a set of standard unions had been prepared for the approval of the Board of Trade, and were then in the custody of Mr. H. J. Chaney, Head Inspector of the Standards Department, London. In view of the suggestion made at the last meeting that the Standards Department of the Board of Trade should be corresponded with, the Committee communicated with Mr. Chaney, who replied that the standard unions in his possession had been made in 1888, and that he had forwarded them to Mr. Jack for inspection; at the same time intimating that it was intended to legalize these standards. The Committee felt themselves to be in a difficulty, and held a meeting with the meter makers, and, after exchange of opinion, it was resolved to arrange an interview with Mr. Chaney, so that the bearings of the question in relation to the attitude of the Standards Department might be discussed; and, in the interval, it was thought better to postpone the manufacture of unions from the standard approved by your Association. Several attempts have been made to arrange a meeting with Mr. Chaney, who is in sympathy with the proposal, but whose professional engagements have thus far prevented his coming to Edinburgh. The Committee had hoped to report further progress at the annual meeting; but they assure the Association that the matter is having their best attention, and they trust that it may be possible to report satisfactory progress in the near future. Meanwhile, the Committee suggest that they should have power to consult with the Council of The Gas Institute and the Institution of Gas Engineers, with the view of taking common action in connection with the adoption of a standard of meter unions applicable to the United Kingdom.

The Committee then referred to the decision come to to present a testimonial to Mr. Carlow, in recognition of his services as Secretary of the Association; and this was done at the Informal Meeting of Gas Managers in Glasgow in April. On Feb. 4, the Secretary received a letter from Mr. T. Whimster, of Perth, tendering his resignation on account of ill-health. The Committee recommended that his name should be entered upon the list of honorary members. In conclusion, the Committee expressed regret that they had had to remove a number of names from the roll of membership, owing to deaths, resignations, and members being in arrear with their subscriptions. Still it was gratifying that there were always a large number of persons applying for admission as new members.

The President invited remarks on the report, and said, if any further information were required, the Committee would be pleased to give it.

Mr. J. Napier Myers (Saltcoats) asked if this would be the right time to move a resolution with regard to the power which the Committee sought with reference to the standardizing of meter unions. If so, he would move that the Research Committee should receive the powers they sought, to correspond with the kindred associations in England, and also with the Board of Trade, with a view to the nationalizing of the meter unions of the standards which they had submitted to the Association. He was of this opinion last year, and moved accordingly; but he then failed to find a seconder. He hoped his motion now would meet with better success.

The President suggested that the meeting might discuss the report, and this subject could come up afterwards. He would formally move the adoption of the report.

Mr. A. Yuill (Alloa) seconded the motion.

The President remarked that, the report having been adopted, Mr. Myers's motion was practically covered. If he wished to strengthen the matter by any means, they would be pleased to hear him.

Mr. Myers thought that, if the adoption of the report met the case, he had no objection to withdraw his motion. Still, if it would strengthen their hands, he should like it to stand. A twelvemonth ago it was felt that it was not necessary to go further. He was then of the same mind as now—that negotiations should be opened with the Board of Trade. He knew that they had undertaken work in regard to the standardizing of meter unions; and he thought it would be unwise for the Association to go forward without taking them with them. This was why he then moved that action be taken. If the powers they sought had been given to the Committee by their adoption of the report, he had no objection to withdrawing his motion.

The Secretary said the Committee had no power to enter into communication with Mr. Chaney and the Board of Trade, and to bring the matter to the termination they sought.

Mr. Myers thought it would make the matter more crisp if he pressed the motion; and he moved accordingly.

Mr. D. Robertson (Dunoon) seconded.

The motion was agreed to.

The President explained that Mr. Myers had alluded to what he said last year; but he forgot, he thought, the instructions which were given to the Committee at the beginning—that they were not to attempt to get the English Associations to join in the matter, because it would delay it for years. They thought that, if they got the matter carried in Scotland, the English Associations might follow suit. Now the subject had to be begun *de novo*, and, unfortunately, after they had paid their money. If the Committee had only had the knowledge that those things had been in existence for ten years—but they knew nothing about it until after they had deposited their standards—they would not have gone on. If the Board of Trade standards were adopted, they would make a uniform standard; and if theirs were adopted, it would be the same. But he thought theirs were much the more simple of the two, It was, however, for the united associations to go into the matter.

The Membership.

The Secretary read a statement regarding the membership of the Association. This showed that seven ordinary members had resigned, two had died, and three had been removed from the roll on account of their being in arrear with their subscriptions; that two extraordinary members had resigned; that two associate members had been removed on account of being in arrear; and that three associates had, on receiving appointments as Managers, been transferred to the ordinary list. The year began with a total membership of 232, which was reduced, by resignations and otherwise, to 216. But there were 16 applicants for ordinary membership, and two for admission as associates; and, with them, the membership would be 235, composed of 152 ordinary members, 61 extraordinary members, 15 associates, and 7 honorary members.

New Members.

The following were admitted to the Association:—

Ordinary Members.—Craig, J., Kilwinning; Duncan, G. H., Gorebridge; Herring, W. R., Edinburgh and Leith; Houston, W. L., Kilbarchan; Langlands, S., Coleraine; Lander, J., Bridge of Weir; Lighbody, T., Renfrew; Macdougall, W. W., Kirkcudbright; M'Farlane, J., Cumnoch; Martin, W., Port Glasgow; M'Crae, W., Dundee; Pollock, R., Mauchline; Simpson, R., Cambuslang; Wilson, A., Perth; Young, J. A., Locherbie; and Young, R., Laurencebush.

Associate Members.—Lang, J., Dumbarton; and Reid, A., Brechin.

Honorary Member.—Whimster, T., Perth.

The President thought it as well that the proposal regarding Mr. Whimster should be put in a formal way. He had very much pleasure in proposing that Mr. Thomas Whimster, of Perth, be added to their honorary list, in accordance with the recommendation of the Committee. He did not think he required to do or say anything to urge this upon the Association. They were all aware, by their records, that Mr. Whimster had been three times President of the Association; and not only that, but he recalled the fact that he was one of the very few alive of the originating members of the Association. He did not know but that he was the one who was the initiating member;

so that, in honouring him, he thought they were honouring themselves.

Mr. J. M'Gilchrist (Dumbarton) said he had very much pleasure in seconding the proposal; but he rather thought that Mr. Whimster's name was very much in the same position as the motion in regard to the couplings—that the meeting having adopted the Committee's report, Mr. Whimster was already an honorary member of the Association.

The proposal was agreed to.

The Murdoch Memorial Fund.

Mr. M'Gilchrist handed in the report of the Murdoch Memorial Fund Committee, giving the state of the fund as on July 27, 1897. He said that the charges in connection with the handing over of the gas-engine to the Glasgow University amounted to £1 12s. 7d.; stamps cost 10s.; Messrs. Crossley Brothers were paid £119 for the gas-engine which was presented to the University; the sum of £20, which was the estimate of Messrs. Crossley, had been handed over to Professor Barr, of the University, as the cost of the removal of the engine from its temporary position into the grand new laboratory which was to be erected at a cost of some £20,000, and which would be completed in the course of about two years; and he had at present a deposit receipt for £40 6s. 2d., and a current account for £14 4s. The Committee had arranged a contract for binding 1000 copies of "Light Without a Wick;" and, in addition, they had arranged that the report in the "Journal of Gas Lighting" of the unveiling of the bust of Murdoch by Lord Kelvin, and also the report in connection with the handing over of the gas-engine to the Glasgow University, would be bound up in the book. Each of the members would, within a few months, be in possession of a copy of the work. Of the remaining copies, they intended to give every public library in the United Kingdom a few; and perhaps in this way they would let the general public know that there was such a great man as William Murdoch, the inventor of gas lighting.

The President said he took it, from the way they had received the report, that it was quite satisfactory. He would propose the continuation of the Committee. There was not much to be done now; but the Committee should continue their labours until they were completed. He therefore proposed that they should be continued in office.

The Secretary said that, since the Committee were last appointed, Mr. John M'Crae, one of their number, had died; and he proposed that in re-appointing the Committee, Mr. Bell (of Dalkeith) be added, in room of Mr. M'Crae—Mr. M'Gilchrist continuing as Secretary and Treasurer.

This was agreed to.

The Auditor's Report.

Mr. R. B. Main (Glasgow), the Auditor, gave in his report. He stated that in the General Fund the charge was £167 10s. 4d.; and that the cash in hand amounted to £42, and the cash in the Treasurer's hands to £1 19s. They would notice that the travelling expenses were greater than usual; and this had been occasioned by the negotiations regarding the meter unions. In the Benevolent Fund, the charge amounted to £253 2s. 3d.; and they had a balance in hand of £200. In the Research Fund, the charge was £150 6s.; and they had a balance of £71 10s. In the Excursion Fund, the charge was £69 10s. 9d.; and they had a balance of £7 10s. For the reasons stated, the expenditure had been somewhat heavier than in the previous year. He had, on former occasions, spoken of the excellent manner in which the accounts were kept by Mr. Carlow. This entailed less trouble on the Auditor than would otherwise be the case. Mr. Carlow deserved the best thanks of the Association for the manner in which he kept the accounts.

The President said he was sure they had all listened with pleasure to the Auditor's concise report; and it was gratifying to know that even with their increased expenditure, their finances were so healthy.

Mr. J. Renfrew (Langbank) said he would like to make a suggestion, which was that the Auditor's report should be issued to the members along with the syllabus of the meeting, so that they might know beforehand about any item they might be interested in, like the balance-sheets of other institutions. He moved to this effect.

Mr. D. Vass (Portobello), in seconding, said that the expenditure would not be so great, as the type would be available for the published report afterwards. He had moved in a similar direction before.

The President said they had some time ago heard Mr. Vass's suggestion to the same effect. There were two or three difficulties in the way. One was the expense. Of course, they did not wish to spend any more money than was necessary. But there was another. If the members would all pay up properly, such a thing could be done; but at the eleventh hour money came in, and when were they to close the books and publish the accounts?

Mr. Main thought the suggestion a good one, because he did not see how members listening to the figures which he read could have an intelligent idea of what they meant.

The Secretary said that he closed the books every year on June 30; and if it were the wish of the Association, the accounts could be published in time, and issued along with the notice calling the meeting. He had no objections whatever.

Mr. Renfrew's motion was then agreed to.

The President proposed that their most hearty thanks be given to Mr. Main for the time and care he devoted to their accounts.

Mr. Main, in returning thanks, said that the work was a pleasure to him; and so long as he held the office, he would do his best in it. It was a responsible position, because the members looked to the Auditor to see that the figures were right.

The President's Address.

The President then delivered the following

INAUGURAL ADDRESS.

Gentlemen,—Last year you did me the great honour of electing me President of our Association. For that I now sincerely thank you, though at the same time I must confess that, in the course of the last twelve months, I have often honestly wished that your choice had fallen on some other member. When I thought of the many able men who have occupied this chair before me, and of the rising young men who are likely to fill it after me, my misgivings as to the wisdom of your choice were both frequent and serious. If I fail, however, it will not be for want of the desire to succeed, but because of those limited opportunities common to all managers of small works. As one of these managers, I have no special work of my own to draw upon for material for an Inaugural Address; and therefore I must crave your indulgence if the few remarks I venture to make prove a little rambling, or savour somewhat of the process of utilizing the ideas of others.

In reminding you that this is the thirty-sixth annual meeting, I am myself reminded of the founding of the Association—the first association of gas managers working under formal rules and regulations. To the few of us who remember those early days, the change in the *personnel* of the membership is only too apparent; and my memory lingers sadly over names that would be unfamiliar to many of you. But I shall not ask you to follow me into the distant and vanished past. Without going farther back than the date of our last meeting, we have sufficient cause to mourn for "friends departed." In that short space of time, we have lost by death no fewer than four members, three of whom had occupied the honourable position of President of the Association. Mr. F. T. C. Linton, who was President in 1884, died at the end of last year. For some years past, indifferent health had kept him away from our meetings; but I am sure we all recognize that in him the gas profession has lost an able and valuable member. Mr. John M'Crae, whose loss we all deplore, and whose breezy individuality we shall very much miss in our deliberations, was our President in 1885; and Mr. Robert Mitchell, our latest bereavement, was our acting President in 1886, and our elected President when we met in Stirling in 1887. Only the other year, too (in 1895), he was President of the Incorporated Gas Institute—a position filled but once before by a Scottish gas manager. Both Mr. M'Crae and Mr. Mitchell were regular attenders at our meetings; and when we met last year in Edinburgh, they both contributed to our proceedings—that being, I believe, almost their last public appearance. There is yet another name to add to the sad list—that of Mr. W. Robson, of Selkirk—a veteran in the profession, and one of the original members of the Association. Through the removal of these gentlemen, many of us have lost old friends, and the Association members whose places cannot easily be filled. We can only put on record the expression of our deep and sincere sympathy with those left to mourn their loss.

Sad, however, as are these breaches made by death and time, and much as we regret them, they must not be allowed to weaken our ranks; for more than ever is it necessary that there should be recruits, willing and ready, and even better qualified than those who have preceded them, to step into the vacant places. Within the last two months, the Presidents of two Associations, kindred to our own, have been urging the necessity of educating the gas engineer in certain definite directions. According to the one, the gas engineer should have a practical knowledge of electrical engineering also; while the other suggests that he should be a chemist as well. With these views I am in complete agreement. It surely may go without saying that in this age the man who would excel in our profession—and, indeed, in any profession—must put the highest value on that education which is to fit him for the best discharge of his duties. Nor, as things are at present, is this by any means difficult to obtain. For my own part, I am often tempted to envy the student of to-day, when I sum up his educational advantages. There are now technical colleges established throughout the length and breadth of the land; text-books, both plentiful and cheap, are to be had, filled with facts founded on well-established principles, after which we were but vaguely and vainly groping some forty years ago; and last, but not least, we have our scientific and technical journals, which keep us well informed, not only of every new discovery, but also of its practical application to our own industry.

But, in addition to this, I hold that there is yet another element in the education of the gas manager which, in too many cases, has been overlooked in the past, and that is commercial knowledge. Forty years ago, this was scarcely thought of, and but seldom required; for at that time we practically held the monopoly for the supply of artificial light, and so long as we could earn our dividends our directors and all others were

perfectly satisfied. But with the advent of the improved mineral oil lamp and the electric light, all this is necessarily changed. If we are now to hold our own, and extend our business also, under these changed conditions, we shall have to abandon our old conservative notions of the "take-it-or-want-it" type, and adopt modern commercial methods. We have not yet, it is true, been educated up to the American fashion of holding gas exhibitions on the pavement; but short of this there are many other ways of popularizing and extending the use of gas. As, however, we are to have a paper to-day by Mr. Pooley on "Ways and Means of Increasing the Consumption of Gas," I shall omit what I intended to say further on this subject; seeing that it will no doubt be fully and effectively dealt with in the paper and following discussion.

On the subject of commercial enterprise in the gas industry, much may be said. Some time ago, one of our political leaders declared that, as a nation, we were subject to panics; and he was inclined to think that such panics often did us good, for, on account of our insular position, without something to waken us up we might fall asleep on our money-bags. This observation might, I think, have been applied to our own profession until the advent of the electric light, which created such a panic among gas proprietors that some of them have not even yet sufficiently recovered to have confidence in the future. A different effect, however, was produced on gas engineers and managers. Electricity and the high-power oil-lamp acted as splendid pace-makers, stirring them into new life; and this stimulating effect has undoubtedly been for our good, and for the good of the community at large. But if we have been able to beat back the tide of invasion, the credit of the victory is not entirely due to ourselves, but to many brilliant discoveries made by outsiders, which have materially strengthened our defence.

Not only have we had to encounter the determined attack of these new illuminants, but we have also had to face a considerable loss in the value of our residual products. To take ammoniacal liquor alone, you are all aware that sulphate of ammonia now sells at only a little more than one-third of its price of, say, fifteen years ago. This, of course, affects us all, whether makers of sulphate or sellers of crude liquor. Various reasons are assigned for this. We have, for one thing, the never-ceasing cry of "agricultural depression," which prevents the farmer purchasing high-priced manures for his land. But for such a decided change there must be other causes besides that. Now, there is one remarkable fact which cannot have failed to strike everyone interested in this matter, and that is that, as sulphate of ammonia has gone back in price and popularity, nitrate of soda has come forward, in spite of the fact, which cannot be denied, that the latter contains 25 per cent. less nitrogen than the former. In searching, therefore, for a reason for such an anomalous state of matters, we must look to the circumstances under which the sale of nitrate of soda is effected. These circumstances, briefly stated, are simply persistent "booming" and constant advertising. The huge Nitrate Syndicate spare no expense in bringing their wares before the public; and even the services of the paid lecturer are freely enlisted. Now, there is almost nothing of this in the sale of sulphate of ammonia. Its merits are practically left to speak for themselves; and the natural and inevitable consequence is public neglect. If, then, we are to compete with the Nitrate Syndicate on anything like equal terms, we must employ methods similar to theirs. It has been proposed, as I dare say you have all noticed in our journals, that a combination of sulphate makers should be formed, in which combination I should suggest that all gas companies take a part, seeing that their interests also are directly concerned. Should this be carried out—as let us hope it will—we can all be of service to the common cause.* Each manager could act as a kind of advance agent, and do all that lies in his power to acquaint possible purchasers with the superior value of this product, thus materially helping its sale.

With this laudable end in view, you will perhaps allow me to direct your attention for a few minutes to some profoundly interesting experiments which have been conducted for some considerable time past at Lord Rosebery's experimental station at Dalmeny, and whose immediate bearing on the subject cannot be over-estimated. I may here say that personally I have been greatly interested in the infant science of bacteriology, especially as regards the action of bacterial germs in the preparation of plant food; and this led me to pay particular attention to the above-mentioned experiments, which are under the sole charge of my friend Mr. John Hunter, the County Analyst for Midlothian. Mr. Hunter, at my request, has kindly placed some of his results at my disposal; and these I now proceed to summarize for your information.

In answer to a query of mine as to the advisability of changing the name "sulphate of ammonia" to "nitrogenous sulphate"—which change I have seen proposed in our journals—Mr. Hunter considers that this would be a grave error; for, in the first place, ammonia, or sulphate of ammonia, has hitherto been the standard of comparison, and manures containing nitrogen have been invariably represented to purchasers as containing so much nitrogen 'equal to sulphate of ammonia." In the second place, sulphate is beyond doubt again coming to the front; and it has been proved by the Dalmeny experiments to produce crops possessing one-half more feeding value than those grown with nitrate of soda. The same experiments have placed it beyond doubt that turnips grown either with nitrate of soda or nitrate of potash are not so sound, and do not in any single case possess the keeping qualities of those grown with sulphate of ammonia. These facts are becoming known to dairymen, who are the principal buyers of feeding stuffs grown near cities; and those farmers who are known to be users of sulphate have this year been asked to sell their turnips before they were even sown. It has, however, to be borne in mind that sulphate of ammonia requires peculiar treatment to be successful.

I may remark that the science of agriculture has of late been entirely revolutionized by Mr. Hunter and Mr. M'Alpine—workers who have placed the subject on a purely biological basis; and those who wish to study the matter further will find it put in a nutshell in the last edition of "Chambers' Encyclopædia," under the headings of "Soils" and "Manures." The peculiar treatment to which I have referred is, however, quite simple, and has been practised at Dalmeny for several years past with such success that, while the crops are undoubtedly better, the outlay for manures has been reduced to less than one-half of what it formerly was. It is simply a fact that, on this splendidly managed estate, not one ounce of nitrate of soda has been used during the past two years, except on the experimental plots. As a further example, I may mention that an extensive farmer, who farms in all the Lothians, has, after satisfying himself as to the results of the Dalmeny experiments, entirely discarded nitrate, and has this year used over a hundred tons of sulphate of ammonia.

The theoretical conclusions derived from these experiments are, so far as I can follow Mr. Hunter, to this effect: A soil to be fertile must be germ occupied—that is, a sterile soil is an unfertile soil. Mr. Hunter was the first, I believe, to lay down this doctrine. He says that the manures, &c., applied to soils which were previously supposed to directly nourish the plants are, in reality, the foods and breeding necessities for soil organisms; and it is these bacterial bodies which convert the added materials into soluble and useful compounds for plant absorption. He further says that nitrate of soda is not of any service to any organism; but, being soluble and diffusible, it goes into the plant unchanged, with the result that crops are produced with lower albuminoid ratio and less solid residue—*i.e.*, with more water, of course, and of poor keeping quality. Sulphate of ammonia, on the other hand, undergoes nitrification in the soil; and it is for this all-important change that the peculiar treatment I have referred to is required. That treatment is so fully described in the many reports of the Dalmeny experiments, published in the "North British Agriculturist," that I need not further refer to it here.

I have, however, been placed in a position to give you a hitherto unpublished explanation of why sulphate of ammonia, when rationally used, must be infinitely superior to nitrate of soda. Nitrate of soda, for the reasons already explained, is absorbed by plants unchanged. Now, soda is not a plant-essential, and, moreover, it cannot perform the functions of those things which are essential—lime, for example. But when sulphate of ammonia undergoes nitrification, it is converted into calcium nitrate—nitrate of lime—which is soluble and diffusible. Here, then, we have the nitrate for albuminoid construction, and we have also the lime, whose presence in plants is of far more importance than has ever been dreamed of. Time will not permit of my going in detail into this most interesting feature; but let me give you just one example to illustrate its importance. In many groups of plants, oxalic acid is being elaborated in large quantity. This requires a base, and the lime carried into the plant by nitrified sulphate of ammonia performs that function. Now, here is, I think, the startling discovery of Mr. Hunter. The process I am describing implies the formation of oxalate of lime in the plant. The crystals of oxalate of lime, which are very abundant in the leaves of the *leguminosæ*, are decomposed by light, and, of course, most rapidly by direct sunlight. This results in the production of one of the most powerful oxidizers known—viz., hydrogen peroxide (H_2O_2)—and this, according to Mr. Hunter, must, and does, oxidize the carbon dioxide (CO_2) absorbed by the leaf, with the result that there is produced elementary starch or sugar. In fact, according to this startling change, we can now account for any and all of the carbohydrates, and, consequently, for the greater starch production in our sunny seasons, and for the universally greater vegetation of tropical climates, where sunshine is the rule.

According to these doctrines—and I, for one, have no doubt whatever that they are correct—nitrified sulphate of ammonia must of necessity be superior to nitrate of soda; and there is every reason to expect that the experiments at Dalmeny this year will be so conclusive on this point that sulphate makers may look forward with confidence to sulphate regaining and maintaining its old and rightful position. These experiments, I would only add, are likely to affect us abroad as well as at home. As you are well aware, one of the main outlets formerly for sulphate of ammonia was the sugar-beet industry; and beet culture being now included at the Dalmeny station, we may expect ere long to be in possession of reliable data which shall place sulphate of ammonia and nitrate of soda in their true positions

* As will be seen from the report in another column, the scheme referred to by Mr. Bell has been successfully formulated.—Ed. J. G. L.

in the cultivation of the sugar-beet. Need I say, before leaving this subject, that it should surely strike everyone with surprise that, in view of the great loss we have sustained, and are still sustaining, by the depreciation of this residual—in view also of the proved results of these costly and elaborate experiments, which are the outcome of Lord Rosebery's liberality and Mr. Hunter's enthusiastic and gratuitous labours, and which, besides, are open to the inspection of the whole world—that literally nothing has been done by those interested, both directly and indirectly, in the sale of sulphate of ammonia to bring such facts before the purchasing public in at least as prominent a manner as that adopted by their rivals the nitrate dealers? Let me express the hope, then, that this state of matters will be remedied in the very near future, and that this residual product will recover somewhat of its former prestige and value.

I have studiously refrained from referring to any current events, seeing that these have been so fully and ably dealt with in the presidential addresses of other kindred associations. I may, however, be pardoned if I just allude to Mr. Stelfox's splendid Gas Institute paper, in which he recounts the failure and difficulties encountered in the working of the Claus process of purification. Mr. Stelfox is certainly to be congratulated on the determined effort he made to secure success with this system of purification in closed vessels; and, as was said in the discussion, he will be a bold man who makes the next attempt. But that the desired end will yet be accomplished, I have not the slightest doubt; and, with the object of hastening that day, I may remind you that our member, Mr. William Young, also patented a process to attain the same result, and read a paper explaining the leading principles involved in his patent at the Stirling meeting of the Association in 1887.* In that paper, he clearly foreshadowed some of the difficulties experienced by Mr. Stelfox—viz., that having to deal with such large quantities of weak liquor would be costly for fuel, and that at the same time it would necessitate the use of very large and duplicate plant. It may be in your recollection that Mr. Young proposed to overcome these difficulties by dissociating the ammonia from the acid gases under considerable pressure. By this means, he anticipated having only to deal with a comparatively small quantity of a strong revivified caustic solution, which would be returned to the plant for further service. I am well aware that Mr. Young proved the correctness of his theory experimentally; but I have never yet heard of its being tried on a manufacturing scale. Is it not possible that by Mr. Young's plan, or a modification thereof, the desired result might be attained?

With this query I shall conclude, hoping that some day a member of the North British Association of Gas Managers may be able to answer it in the affirmative.

Mr. H. Pooley (Dunfermline), moved a vote of thanks to the President for his able address. His remarks regarding sulphate would, he was sure, be useful to many who were Managers of gas-works in agricultural districts.

Mr. S. Stewart (Greenock) had much pleasure in seconding. They all knew that anything which would tend to raise the price, or increase the use, of sulphate of ammonia deserved their best attention.

The President thanked them for the hearty way in which they had responded to his address.

Invitation from Sir William Arrol.

A letter was read from Mr. Andrew Stewart, of Glasgow, one of the members of the Association, stating that Sir William Arrol invited the members and their friends to visit Seafield House, his residence in Ayr. Neither Sir William nor his lady was at home; but he had sent instructions that the whole place was to be thrown open, and would be glad if the Association would avail themselves of the invitation.

At a later stage of the proceedings, on the motion of the President, Sir William Arrol was thanked for his kindness in inviting the Association to visit his house.

Reading of Papers.

The reading of papers was then commenced. The first taken was Mr. Hubert Pooley's paper on "Ways and Means of Increasing Gas Consumption," and it was followed by those of Mr. T. Wilson and Mr. D. M. Nelson, on "Prepayment Meters" and on "The Best and Most Economical Means of Gas Purification." These, with the discussions thereon, will appear in succeeding issues of the "Journal."

Election of Office-Bearers.

The result of the ballot for the election of office-bearers was as follows:—

President.—Mr. Thomas Wilson, Coatbridge.
Vice-Presidents.—Mr. Hubert Pooley, Dunfermline, and Mr. W. Ewing, Hamilton.
Hon. Secretary and Treasurer.—Mr. R. S. Carlow, Arbroath.
Members of Committee.—Mr. J. W. Carmichael, Barrhead; Mr. J. Henderson, Newton-on-Ayr; Mr. A. Smith, Aberdeen; and Mr. S. Stewart, Greenock.
Auditor.—Mr. R. B. Main, Glasgow.

Place of Next Meeting.

In accordance with the ballot, Glasgow was fixed as the next place of meeting.

* See "Journal," Vol. L., p. 202.

Votes of Thanks.

The President said that, while they had thanked the individual readers of papers, he thought they might now pass a general vote of thanks to them. He wished to say that he thought there was room for reflection on the general body of members, because of their not coming forward with papers. He thought it was not fair. They were all reaping benefit by the Association; and they should all do something for it. There was any amount of ability. They had had admirable papers before them that day, and papers which showed that it was not necessary to have deep and abstruse subjects, or to wait for original matter, but that their every-day work was sufficient material for a paper and a valuable discussion. He therefore moved a vote of thanks to the readers of the papers collectively.

Mr. S. Stewart proposed a very hearty vote of thanks to the Secretary.

The President seconded; and Mr. Carlow returned thanks.

The President's Medal.

Mr. Yuill said they had now come to the end of the meeting. It had been a very successful one; and its success had been brought about by their worthy President, in the admirable way in which he had conducted their business. He felt that their President had raised the tone of the Association this year; and if the younger members would take the advice he had so kindly given them, and try to assist in the furthering and advancing of the work of the Association, they would all benefit. He had much pleasure, in the name of the Association, in presenting Mr. Bell with the President's Medal; and he hoped that he might long be spared to wear it.

The President, in returning thanks, said he had not had much benefit from attending formal meetings of such Associations, because, as they knew, the most part of his life had been spent abroad. But still he had the benefit of the papers which were read, and the discussions upon them, at those meetings. There were members of their profession throughout the whole world, who had no associations and no meetings; and the records in their journals of the meetings of such as this Association, were to those gentlemen invaluable. Members at home, therefore, did not need to say that any papers which they might read were only for themselves. He remembered when he used to peruse such papers and discussions with the greatest pleasure and interest.

The Dinner.

The members and their lady and other friends afterwards dined in the Glasgow and South-Western Railway Station Hotel, to the number of 120. Mr. Bell again presided.

Excursions to Burns's Monument, Etc.

Through the kindness of the Gas Companies of Ayr and Newton-on-Ayr, the members and their friends were entertained to an excursion to places of interest in the vicinity of the town. Leaving the Station Hotel in six *chars-à-bancs* and brakes, they drove first to Seafield House, in response to the invitation of Sir William Arrol. After a walk through the interior of the beautiful mansion, they assembled on the lawn and were photographed. The drive was then resumed by the low road, past the racecourse, to "Alloway's Auld Haunted Kirk," thence to the Burns Monument and to the Auld Brig o' Doon, both adjoining. The company assembled on the brig, and, uncovered, sang, with pathos, the celebrated song by Burns, "Ye Banks and Braes o' Bonny Doon." On the homeward drive, the cottage in which the immortal poet was born was passed; but it being after eight o'clock in the evening, admission could not be had to the interior. The excursion was in every respect a success, and was greatly enjoyed by all who shared in it.

On Friday a very large party of the members and their friends enjoyed a sail, in the steamer "Neptune," belonging to the Glasgow and South-Western Railway Company, from Ayr to Ormidale, at the head of Loch Ridden, in the Kyles of Bute. The weather was for the most part dull, but fairly good; and the sail was an enjoyable one.

BRITISH ASSOCIATION OF WATER-WORKS ENGINEERS.

We commence this week to supplement the report of the proceedings at the annual meeting of the above Association (published in our last issue) by giving a general indication of the contents of the first two of the eight papers read, with notes of the discussions.

Some Middlesex Well Sections.

Mr. W. Whitaker, F.R.S., F.G.S., contributed a paper bearing the above title; but, as he admitted, it was practically unreadable—being, with the exception of a few opening paragraphs, a mass of details in tabular form. None of the well sections (particulars of fifty of which were given) were, save that of the new Enfield well of the New River Company, of any special interest, either on account of great depth, of peculiarity of the beds passed through, or of great importance as regards water supply. Nevertheless the whole gives an amount of information of great value in supplementing previous knowledge; and when published in the "Transactions" of the Association, will be

very useful for reference. The object in all the wells has been to pierce through the tertiary beds into the chalk; and this has been effected at depths varying from 82¾ feet at Harrow, to 370 feet at Hounslow. In most cases, the chalk has been bored in to a depth of over 100 feet; in many, to over 200 feet; but in four only, to over 300 feet—the figures varying from 4 feet at Bow, to 519 feet by the Strand, in which last case alone has the middle chalk been reached. These two are also the shallowest (149 feet) and the deepest (739½ feet) of the whole. Six others exceed 500 feet in depth.

As a sample of the tables, we reproduce the one relating to the Whitewebbs well of the New River Company at Enfield, which has been sunk this year by Messrs. Docwra. The particulars (which were communicated by Mr. J. Francis, the Engineer of the Company) were as follows: "120 feet above Ordnance datum. Shaft 201 feet, 14¼ feet diameter in the clear at top, and 12 feet at the bottom. Adits at 190 feet down. Borings from the floors of the adits. Average rest-level of the water, about 80 feet down. A large yield has been proved." The strata passed through are described thus—

		Thickness. Ft.	In.		Depth. Ft.	In.
Soil		1	0	..	1	0
[? Glacial Drift] Gravel		11	0	..	12	0
London Clay, 45½ ft.	Blue clay, with 4 in. of shells at the base	37	4	..	49	4
	Indurated clay	0	10	..	50	2
	Basement-bed: Sand, with sandstone 4 ft. to 5 ft. down, and with 4 in. of shells at the base	6	4	..	56	6
	Basement-bed: Black [flint] pebbles	1	0	..	57	6
Woolwich and Reading Beds, 42 ft.	Mottled clay	6	2	..	63	8
	Sand, with shells at 83 ft. to 83½ ft.	35	4	..	99	0
	Black [flint] pebbles	0	6	..	99	6
Thanet Sand, 16 ft.	Dark sand	15	6	..	115	0
	Flints	0	6	..	115	6
Chalk with flints, white, some of a sticky consistency		284	6	..	400	0

In the course of the discussion,

Mr. F. J. BANCROFT (Hull), referring to the New River well, said he noticed the author stated that a large yield of water had been proved. If he could inform the members as to the amount of water that had been pumped, and the level to which the water was reduced in the well by the pumping, it would be of great interest. Mr. Whitaker said the average rest-level of the well was about 80 feet down; and one would suppose from the particulars given, that the water was under pressure. He also asked whether the author could give them any information as to the advantage to be obtained by borings from the floor of the adits. Could they know the size of these borings; how deep they went down; and whether there was any extra pressure delivered through them by the water in the adits?

Mr. C. E. JONES (Leyton) remarked that the subject of underground water was of considerable importance at the present time; and he had no doubt it would engage the attention of Parliament before long, and some modification would be made in the law relating thereto. The only question he wished to ask was, Did the large introduction of wells or boreholes tend to a reduction of the level of underground water; and, if it did, in what period of time might they expect any appreciable exhaustion of such a supply? He had heard it stated that underground waters were inexhaustible; but he hardly thought that could be substantiated. If they could get the ratio of the depression of the natural level of underground water, so that they could make their own calculations, it would be a very handy rule for the members.

Mr. D. M. F. GASKIN (Nottingham) said it was well known that, in the case of underground waters, there were really two sources of supply—the original storage and percolation. In the course of time, there was a reduction of the level of the original storage; and all that was to be depended on was the percolation due to the rainfall. In the Nottingham and Newark Bills, there was a great divergence of opinion between the experts as to the percolation. With 26 inches of rainfall, it was stated that there would be from 5 inches of percolation to as much as three-quarters of the total. Mr. Jones wanted a ratio for guidance. It appeared to him (Mr. Gaskin) that no one was in a position to give him anything of the kind; it would have to be a matter for experiment in different districts. For instance, in the case of a well sunk near a town, after a time the storage water would give out; the town would expand; and the contributory area of that well would be reduced by new streets, sewering, and so on. Therefore, each engineer must take steps to obtain a guide for himself in his own particular district.

Mr. W. G. PEIRCE stated that at Richmond they had driven 7000 feet of adits, but unfortunately had met with little water. They had tried everything, even water diviners, but not at the expense of the ratepayers. The cost was borne by his Chairman, who said he would have them called in, in order to satisfy everybody; but they did not obtain anything definite from that direction.

Mr. GASKIN said he wished to add, with regard to the water-level in the district round Nottingham, that the rainfall records clearly demonstrated that for the past ten or twelve years there had been a deficiency of at least 4 inches of water over the average of the last 30 or 40 years. Of course, a great deal depended on the time the rain fell. If the bulk fell during the summer months, the evaporation was considerably more; but if it came down between October and the end of March, half or three-quarters would find its way into the earth.

Mr. W. MATTHEWS (Southampton), alluding to the relative value of headings and borings, had no hesitation in saying that, generally speaking, borings in the chalk were not worth the expense where they could get in headings. As to the establishment of some rule for the rate at which water could be taken away without doing damage to the surface streams, there had been a bitter controversy over that; but there had been no agreement of opinion. In referring to the question as to the amount of water available by percolation, he called attention to the experiments tabulated in the report of the Royal Commission on the Metropolitan Water Supply. In that report there was a key to the establishment of the only safe rule that could be possibly laid down. He alluded to the tables giving the results obtained by the experimental gauges at Nash mills. It seemed to be assumed that the amount of water available bore a direct ratio to the amount of percolation; but, if they took the trouble to go into those tables very carefully, it would be found that the ratio departed very widely from the amount of water that percolated. It seemed to show that the percolation gauges used were on too small a scale, and that there were too many outside influences at work to make them of any possible value. But they showed there was an absolute direct ratio existing between the annual rainfall and the rise and fall of water in wells. Therefore, instead of entering upon a series of observations extending over a great many years, if anyone took steps to obtain the rise and fall of any particular well and the rainfall for a limited period, he could predict, with a great amount of certainty over any period of time, what would be the rise and fall, and consequently the saturation level of the chalk, in the district.

Mr. J. SHAW (Boston) remarked that the water-level round about London was sinking every year, although not so rapidly as it was some years ago; but a great deal more water was now being pumped from the outside area for the supply of the London district. Some years ago, when he occasionally visited Mr. Peirce at Richmond, he had an idea that, when water appeared on the top of the ground, there was little below. To a great extent, that opinion was then, and was still, shared by Mr. Peirce, because his well had not been the success it was expected it would be. At the same time, there were a number of wells round about London that yielded a comparatively large quantity of water. The New River Company had, he believed, about thirteen wells from which they occasionally pumped; and they had three or four at which they had no machinery, but used simply as a record for determining the rate at which the water was lowering in the London district. Within the last few years, the New River Company had sunk three wells, the latest of which was referred to in the paper. He understood that permanent machinery was being put in at that well to pump 3 million gallons per day.

The PRESIDENT spoke of the value of the paper for reference purposes; and on the question of boreholes *versus* headings, he thought their relative value must be a matter for consideration in each individual case.

Mr. WHITAKER, in replying, remarked that additional figures as to the New River well could not yet be given; but he thought the particulars they had proved that the water was under pressure. As to the advantages of borings or headings, he pointed out that it sometimes happened that a boring would strike an independent supply at a lower level. Very often, too, borings would pay in order to ascertain what kind of chalk there was lower down. As to the rule which Mr. Jones desired, he believed one could be applied to London, but there could not be a general rule for all districts.

A vote of thanks was passed to the author.

Mr. T. N. RITSON (Kendal) read the second paper. It was entitled—

THE REMOVAL OF INTERNAL CORROSION FROM THE MAINS OF THE KENDAL WATER-WORKS.

There are, the author stated, two distinct districts of water supply in Kendal—No. 1 (or "low service") is supplied from a reservoir situated 400 feet above Ordnance datum, and which has a capacity of 12 million gallons. The water supply to this district is further supplemented from a pumping-station when necessity demands it. No. 2 (or "high service") is supplied from a reservoir situated in the same gathering area as the previous one, but is 464 feet above Ordnance datum, and has a capacity of 6 million gallons. The total area of the gathering-ground is about 200 acres. It was principally with reference to the scraping of the mains supplying water to the high-service district that the paper dealt.

When the author undertook the management of the Kendal Gas and Water Works in 1892, the water supply was in the hands of a private Company, who unfortunately had allowed the mains and service-pipes to get into a bad state, with the result that the leakage and waste of water was abnormally high, and the supply unsatisfactory. The climax was reached during the drought of 1893, when, owing to the defective supply, particularly to the higher portions of the town, the local authorities determined to approach the then existing Company with a

view to acquiring the combined undertakings, which was ultimately carried into effect in 1894.

Immediately the Corporation obtained possession, they set to work to construct a new reservoir, situated 742 feet above Ordnance datum, and which is now under way, and, when completed, will have a capacity of 120 million gallons. In conjunction with the new reservoir scheme, it is also proposed to construct filter-beds and clear-water basins, for the purpose of filtering the water from the present upper and lower reservoirs. The new reservoir is intended to act as an impounding reservoir, from whence the present reservoirs will be fed. As the filtration scheme would naturally reduce the head of water, it was evident that, in order to successfully provide a continuous and improved supply of water to reach to the top storey of the highest house in No. 2 district, it would be necessary to thoroughly overhaul and extend the mains.

Before going to any considerable outlay for extensions, the author recommended that the 6-inch trunk main from the upper reservoir to its terminus, and also the leading 4-inch main in the district, should be scraped. For this purpose, he employed a 6-inch pressure scraper of the Appold type, modified and improved by Mr. T. Kennedy, of the Glenfield Company. It consists of two distinct parts connected by a swivel joint—the front carrying eight steel scrapers, and the rear portion steel propelling pistons. Leather discs, intersected by radial cuts, and stiffened at the back by lead plates, are placed behind each piston. The springs, with steel scraping edges, are arranged in two sets of four each; the set behind breaking joint with that in front. The cutting edges are set in such a way that should the scraper encounter anything in the shape of a projection, such as a ferrule screwed into the pipe, the whole machine will slew, or turn round, and thus pass the obstruction without getting blocked; while the leather packings behind the pistons will fold back, and pass any obstruction that can be cleared by the pistons themselves. It is advisable, said the author, to have two sets of pistons of different diameters; so that, when the scraper is inserted into the main for the first time, the smaller-sized pistons may be used, and after the main has been partly cleared of obstruction, then the larger sized pistons can be employed.

The author proceeded to describe his experiences during the scraping of the mains, which work was commenced on Dec. 17 last. Men were posted along the 6-inch main running from the reservoir at intervals of 25 yards, with instructions that, directly the scraper passed underneath (which can be easily distinguished by a low rumbling noise), each man should shout "Passed" to the one in advance. There were several stoppages of the scraper; but its position was easily detected by the stethoscope, from the sound of the water rushing past. One cause of stoppage was found to be due to about 12 lbs. of lead—the result of a badly-run joint. The day following that named, the scraper was inserted a second time in the hatch-box at the reservoir; and, on the water being turned on an exciting chase took place, for a distance of 2523 yards was reached in seventeen minutes. A good deal of filth and corrosion was removed on each occasion; the main being afterwards well flushed. One length of main was found to be so badly corroded that in some places there was barely a 2½-inch water-way through it; and as the pipes had not been treated with Dr. Angus Smith's composition, the "carbuncles" of oxide of iron had coalesced to such an extent, and were, moreover, so firmly fixed to the interior surface of the pipes, that it was regarded as next to impossible to successfully scrape them. In the end, it was deemed advisable to replace the main with a new 6-inch one, at an estimated cost of £250.

The author next described the scraping of 830 yards of 4-inch main, which was known to be badly corroded. For this a set of steel spring scrapers was made, somewhat on the model of the 6-inch scraper, without the rear or propelling pistons, but with a ring formed in the front of the apparatus to hook on to a rope. The main was cut at intervals of 90 yards. Length after length of ¾-inch steam-tube was screwed together, and passed through the main until it emerged at the other open end. The rope was then hooked into an eye made in the front length of tube, and the whole withdrawn. One end of the rope was then attached to the drum of a crab winch; and the other end hooked to the scraper before being inserted into the main. A piece of 4-inch pipe was cut to length, and rubber bushes slipped over the ends of the cut main; the whole being evenly and tightly clamped together by means of clip joints. A gentle stream of water was turned on, and the scraper slowly drawn through the main by means of the winch. This operation was repeated twice; and the main well flushed after each scraping. On completion, the corrosion had been completely removed; and the pipes appeared almost as good as new. The cost of scraping this 830 yards amounted to 6·32d. per yard. This is higher than it would have been but for the breaking of one of the lengths of ¾-inch tube inside the main, and which had to be cut out. The author has found that 4-inch pipes which have been treated with Dr. Angus Smith's composition can be scraped quite easily, and at a cost of from 4d. or 5d. per yard. The total cost of scraping 3190 yards of 6-inch main amounted to 4·08d. per yard.

Needless to say, the water supply to the high-service district, has been so much improved, without the anticipated extensions of the mains, that the author is now able to give a constant supply from the lower reservoir, which was impossible before scraping; and there is, he says, no doubt the filtration scheme will successfully provide the district with a continuous and improved supply of water when installed.

In conclusion, the author drew attention to the desirability of having all pipes and castings in connection with water supply treated with Dr. Angus Smith's composition.

The paper was followed by a lengthy discussion, of which we give the main points.

Mr. W. G. Peirce (Richmond) pointed out that the water in the London Basin was not so active in producing incrustation as that with which Mr. Ritson had to deal. But, of course, most water would cause incrustation in pipes that were not coated by Dr. Angus Smith's solution. He spoke of the utility of scrapers in detecting stoppages, caused either maliciously or by accident. A short time since he took out an old main, in which he found a whole brick; and on another occasion, he discovered a large bone in a piece of 3-inch pipe. Where yarn was used in the sockets in making joints, heaps of lead were frequently found inside the pipes. Sometimes the use of these pipes went on for years; and the obstructions were not discovered until late in their life. He was almost inclined to make use of the scrapers to locate some of those stoppages.

Mr. F. Hunter (Sevenoaks) had had some experience in Mr. Ritson's immediate neighbourhood; and could testify that, in the case of gravitation works, the mains became very corroded. The complications arising from the over-yarning of joints were also very curious. What seemed to be an 8 or 6 inch main often proved, through obstruction, to be only equal to a 4 or 3 inch pipe. He strongly advised anyone who had a suspicion that trouble of this kind existed to use the scrapers.

Mr. D. M. F. Gaskin (Nottingham) said there was no doubt that incrustation in pipes was almost entirely confined to water from catchment areas, and that where water was obtained from wells there was not so much trouble in this respect. He believed the first idea of scraping water-mains emanated from Liverpool, where they were bothered as to the quantity of water obtained through a 44-inch main running from Rivington. The original drawing of the proposed scraper—a crude one, he must admit—was sent from the office of the Water Department to Mr. Kennedy, who submitted something very much better; and the scraper for large mains was the result.

Mr. T. Kennedy (Kilmarnock) remembered the circumstance mentioned by Mr. Gaskin. The drawing submitted to him from Liverpool was altered very considerably; and a price was given for doing the work. But it was never carried out, although, if he were now twenty years younger, he would perhaps tackle the job. He also referred to experiences he had had of the stoppage of mains by large pieces of timber.

Mr. H. Francis (Devonport) said he had experience with scrapers, supplied by Mr. Kennedy, more than twenty years ago. The attempt was made on a 9-inch main, which had been laid about thirty years, and which was 2½ miles in length from the reservoir. The difficulty he found was to get, in starting, sufficient head of water to drive the scraper; they had only the head of water due to the depth of water in the reservoir. The corrosion was found to be too hard. He then obtained an 8-inch scraper; but with the same result. The scrapers were still in his possession; but he was afraid they were not likely to be employed again. If used in a main in which there was a ferrule, the scraper was almost sure to become fixed at that point, and would have to be cut out.

Mr. C. Gilby (Bath) thought the success of the scraping depended upon the character of the water. At Bath, they were troubled with hard water; and the deposit in the mains was almost too hard for the scraper to remove. Some years ago, he attempted to scrape a main laid in 1847. They dragged the scraper through short lengths by means of ropes, as they could not get any head of water. But the cost was out of all proportion to the success of the operation, although they were able to get the main fairly clean in the end. He thought too much stress could not be laid on the value of coating pipes.

Mr. W. Ingham referred to the experiences at the Torquay Water-Works in the scraping of 14 miles of main. An 8-mile section took from three to three-and-a-half hours to scrape; and the second length (about six miles), three hours. With regard to carbuncles in the main, careful analysis of the material of which the nodules were composed showed that it consisted of corrosion and solid matter deposited from the water. When the carbuncles were formed in the first instance, especially with coated pipes, it would be found that the area of corrosion underneath was very small; the size of the actual rusting being not larger than a pin's head. Mr. Francis had referred to the scraper stopping when it came against a ferrule; but he had not found any difficulty in that respect, probably because the ferrule did not run far into the pipe. The scraping at Torquay cost about £1000 in the first case; but as the original outlay on the main was £30,000, there was a great saving compared with taking it up. By scraping the mains, they realized an increase of 115 per cent. in the delivery of water. They had reason to scrape 14 miles of main last year. From an 8-mile section, the scraper, when it came out in the hatch-box, brought with it 35 lbs. of lead and half a barrow load of stones; and there was a greater amount from the 6-mile length.

Mr. J. Shaw (Boston) said his experience was that it was generally soft water that incrusted pipes, especially where it

had not been filtered. He found at Boston that pipes through which there was a large flow of water were very free from incrustation, and that the carbuncles formed at the dead ends. He referred to some pipe scraping which he witnessed in the Midlands, and which was done without a hitch. He was thinking of using a scraper at Boston; and as to the difficulty of getting a head of water from the reservoir, he meant to have a steam fire-engine to force 300 gallons a minute into the main at the back of the scraper.

Mr. E. SANDEMAN (Plymouth) thought it would be better if, instead of having to use scrapers, they could prevent the incrustation in mains. He found that, by flushing pipes (if they were coated in the first instance), he was able to keep them clearer than they would be otherwise. He happened to be in a town where the corrosion or deposit was very great; and he had taken up 4-inch pipes through which one could hardly see a space larger than a lead pencil.

Mr. F. J. BANCROFT (Hull) said that, from analyses of the deposit in pipes, it was found to be partly oxide of iron, partly insoluble sandy matter, and partly volatile, combustible matter. The oxide of iron—whether a magnetic or simple iron oxide—formed only a small portion of the total. In a diagram exhibited by the author, the carbuncle was shown hollow; and it would therefore appear in that case to be more of the nature of a deposit than actual corrosion. Confirming what Mr. Peirce had said, he added that he had only to deal with chalk water; and fortunately was not troubled with incrustation, deposit, or corrosion to any extent.

Mr. C. H. PRIESTLEY (Cardiff) said that, in regard to the scraping of mains, Merthyr Tydfil showed the best results of any place outside England, as they had obtained 82 per cent. more water through one pipe after scraping than they did before. This was splendid evidence in favour of the scraping of pipes. Some pipes, whether coated or not, with certain waters, would become corroded.

Mr. W. A. RICHARDSON (Birkenhead) stated that he had found pipes, which had been coated with Dr. Angus Smith's solution, perfectly clean after thirty years' use.

The PRESIDENT said it seemed to him the word "corrosion" might be subjected to some qualification. It appeared that what they were talking about was a combination of several items—corrosion, incrustation, and deposit. Possibly the term "incrustation" would be the best one. He supposed it had not been considered necessary, on the score of cost, to scrape pipes of 3 or 4 inches diameter. For his own part, he had rather taken up such mains, and laid new ones. After spending large sums of money on the laying of mains, it seemed desirable that something should be run through them to see they were quite clear. None of the speakers had referred to wrought-iron pipes. He had known of instances where wrought-iron services had not been in use many months before they were completely blocked up. In regard to the flow of water, if they had mains too large for the work required of them, it gave them a greater chance of corroding; they wanted velocity, or a flush to scour them. He also testified to the value of coating pipes.

Mr. RITSON, in reply, said, with reference to Mr. Peirce's remarks, he thought it was generally accepted that upland water did affect cast and wrought iron pipes to a much greater degree than the hard waters of the south. As to the head of water necessary to set the scraper in motion, the top reservoir at Kendal was 464 feet above Ordnance datum; and the lowest point about 154 feet. They therefore got a tremendous rush upon the scraper, which sent it simply flying through the mains. The second occasion on which they put the scraper in the hatch-box, it travelled 1½ miles in 17 minutes. Regarding the remarks as to incrustation at the dead ends of the mains, he thought that perhaps it was a mixture of incrustation and deposit which was carried to those points. Mr. Ingham had drawn attention to the fact that the incrustation in a coated pipe was attached by the merest holding; but still it was sufficient to stop the flow of water. The scraper, however, soon removed it; and the pipe was then as good as when put in. As to filtration, it certainly had the effect of preventing a certain amount of peaty matter getting into the mains; and consequently it could not get mixed with the iron rust.

A vote of thanks was accorded the author for his useful paper.

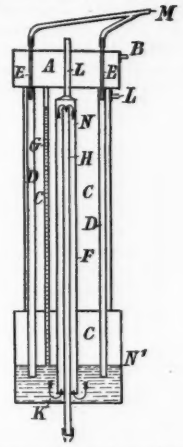
"Graphic Methods of Engine Design."—We have received a copy of a little work under this title by Mr. Arthur H. Barker, B.A., B.Sc., published by the Technical Publishing Company, Limited, of Manchester. The object of the author, as explained in his preface, is to convey to junior draughtsmen, and to young mechanics who aspire to a position in the drawing office, an idea of the sort of mathematical knowledge required in designing engines on correct principles.

Belgian Briquettes.—The exports of briquettes from Belgium in May amounted to 56,912 tons, as compared with 43,860 tons in May, 1896, and 50,684 tons in May, 1895. The aggregate exports for the first five months of this year were 215,291 tons, as compared with 195,897 tons in the corresponding period of 1896, and 184,371 tons in the corresponding period of 1895. In these totals the exports to France figured for 100,246 tons, 85,928 tons, and 73,858 tons respectively; and those to Switzerland for 32,255 tons, 24,450 tons, and 23,634 tons respectively.

REGISTER OF PATENTS.

Gas-Compressing and Pressure-Regulating Incandescent Lighting Apparatus.—Rothgiesser, G., of Düsseldorf, Germany. No. 8186; March 30, 1897.

The claim for this invention in hydraulic gas-compressing apparatus, is for a receiver provided with a hydrostatic discharge-pipe, or a tube in which the pressure water used in the apparatus must rise to a given height before reaching the entrance to the exit-tube. In such a hydraulic gas-compressor (having a gas-supply reservoir and a receiver for compressed gas and water situated below it), the patentee proposes to arrange a regulating-tube connecting the receiver with the gas-reservoir, and adapted to conduct compressed gas from the receiver back to the gas-reservoir, when the water in the latter drops below a given level.

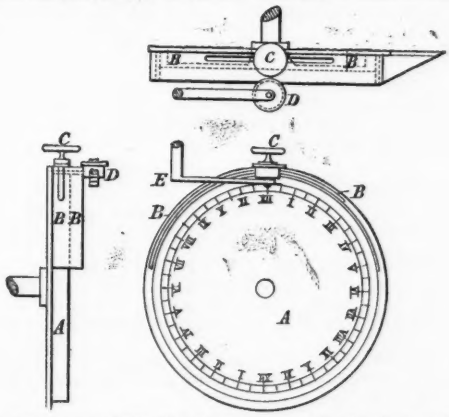


The hydraulic gas compressor and regulator, adapted to operate as described, is shown in the engraving. A is the suction chamber or reservoir for gas supply; the gas entering at B, where a check-valve may be fitted. C is the receiver or separating chamber; D are the injector tubes; E, the jet pipes; F, the ascension-pipe for the outflowing water; and G, the regulating-tube. Through the tube H the water passes off, after it has reached the upper end of the tube F; and through the tube I the air communicates with the upper end of the tube F. From the separating chamber the water escapes at K, and the compressed gas at L, whence it is conducted to the lamps.

If high-pressure water enters the jet-pipes E through the supply-pipe M, the gas will be drawn from A through the tubes D and forced into the chamber C, where the pressure will correspond to that of a water column situated between the horizontal lines N and N¹. As soon as the pressure of the gas surpasses this limit, the level of the water in the chamber C sinks below the edge of the regulating-tube G; and then the water contained in the tube G and a portion of the compressed gas is forced through the tube G into the chamber A. Consequently, the gas pressure will drop a little, and the water-level will again rise to the lower end of the regulating-tube. The water and gas which have entered the chamber A through the tube G are then again injected into the separating chamber.

Automatically Lighting and Extinguishing Street and other Gas-Lamps.—Blommert-Miles, E., of Grove Park, S.E. No. 16,865; July 30, 1896.

The patentee proposes to effect the automatic regulation of the supply of gas to a self-lighting burner or series of burners, by means of a circular guide or disc A furnished with a rim at right angles to its plane or attached to the periphery of the disc. The rim is formed of two portions



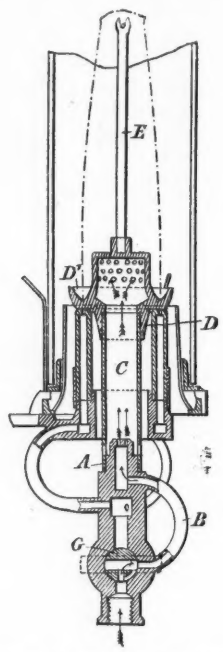
of different levels; and the disc is made to revolve by clockwork once in twenty-four hours, or any other period of time. The fall of the disc is divided into twenty-four equal divisions, which are again sub-divided. A wheel (which may be flanged), with its axle affixed to the end of one arm of a pivoted lever, is placed upon the rim of the disc, so that, as the disc revolves, the lever remains steady while the wheel is on each portion of the rim, but is automatic as the wheel passes from one lever to the other. The other end of the pivoted lever is connected to the gas-supply tap or valve. While the wheel above referred to is on the higher level B of the rim, the supply tap is open; and while the wheel is on the lower level of the rim, the tap is closed or partially closed, as may be

desired. The arm of the lever to which the wheel D is affixed is preferably weighted, so as to keep the wheel in contact with the disc; and, of course, the clockwork has to be regulated having regard to the friction of the wheel upon the disc.

The time during which the tap is open is regulated by altering the length of the higher portion of the rim B. This is effected by forming it of two sliding portions, clamped in any desired position by the thumb-screw C, according to the time the tap has to be kept open. The disc and the lever arrangement E may be enclosed in a gas-tight chamber, into which gas is admitted, and from which it is cut off by the revolution of the disc; or the tap attached to the lever may be made to admit and cut off the gas to and from a chamber behind the disc. The gas is taken for consumption from the chamber by a continuation pipe.

Gas-Burners.—Sugg, W. T., Wright, E. S., and Mattock, W. G. H., of Regency Street, Westminster. No. 16,832; July 29, 1896.

The object of this invention is to provide means whereby an ordinary argand burner may be converted into an incandescent burner, and part of which means may in case of need be removed, and another part rendered inoperative, so as to leave the simple argand burner available for use.



The illustration shows (in sectional elevation) one of Sugg's "London" argand burners, with the incandescent appliance adapted thereto. The centre peg A is bored out to form a gas-chamber, and is connected with the gas-pipe or with the barrel of the gas-cock by the pipe B. The top of the gas-chamber may be closed by a perforated cap, to break up the stream of gas into a number of fine streams. C is a tube fitted on to the peg A, and having openings near to the bottom to allow the inlet of air. This tube forms the mixing-chamber, and, with the hollow centre peg, constitutes a bunsen burner. The tube C carries at top a distributing appliance, preferably made of steatite. It consists of a hollow stump D, which fits closely on to the tube C; an annular tray, to receive the foot of the mantle; and a perforated chamber, which serves as the burner. The tray covers the argand ring, which is thus fully protected. The mantle is carried by the rod E, which fits into the socket on the top of the perforated chamber. G is the gas-cock, which is so arranged that it may be used for the main burner, for the bunsen burner, or for cutting off the supply.

If the mantle is destroyed, and it is not convenient to provide a new one for the moment, it is only necessary to turn off the gas from the mixing-chamber, and remove the steatite burner, when the argand burner can be used in the ordinary way.

APPLICATIONS FOR LETTERS PATENT.

17,021.—Godin, E., "Acetylene gas generators." July 19.

17,090.—Barnard, E., "Generation of acetylene or other gases." July 20.

17,204.—Southall, J., "Gas and oil motor engines." July 21.

17,209.—Beechey, C. G., and Wright, A. T., "Coin-freed gas-meters, and other analogous fluid measuring apparatus." July 21.

17,284.—Masterman, C. E., "Ventilating incandescent gas-lamps." July 22.

17,311.—Silvester, M., "Incandescent gas-burners." July 22.

17,317.—Petreano, E., and Bonnet, J., "Gas and hydrocarbon engines." July 22.

17,332.—Pearson, R., "Improvements in the combustion of gas." July 22.

17,333.—Whitington, W., and Sheridan, H. B., "Apparatus for lighting and extinguishing gas-jets by means of electricity." July 22.

17,351.—O'Connor, H., "Indicating, ascertaining, and recording the pressure of a column of gas or other fluid." July 23.

17,388.—Howes, J. T., "Coin-freed mechanism for meters." July 23.

17,429.—Grove, J., "Oil or gas engines." July 24.

17,448.—Carter, R. F., "Production and storage of acetylene gas." July 24.

17,482.—Reggiani, N., and Chrisini, A., "Acetylene gas generators." July 24.

PARLIAMENTARY INTELLIGENCE.

HOUSE OF LORDS.

Thursday, July 29.

SOUTHWARK AND VAUXHALL WATER BILL.

On the question that the above Bill be passed,

Lord Tweedmouth said he had some amendments to propose to the Bill, but they were not animated by any hostility to the Southwark and Vauxhall Water Company, nor by any desire to restrict their facilities for obtaining water with which to supply their customers. There were, however, points in the Bill which were against what he might call public polity. The Government had decided that the whole subject of the London Water Supply should be referred to a Royal Commission; and it seemed to him to be desirable that, pending the report of that Commission, nothing should be done by Parliament which might prejudice or prejudge the subject referred to the Commission or encourage a long and costly fight during the sessions, while the Commission was holding its sittings. He was afraid that by passing the Bill as it stood there was a danger of both these undesirable things arising. The history of the Bill was a somewhat unusual one. The Southwark and Vauxhall Water Company had for some years been taking from the Thames water largely in excess of the quantity sanctioned by Parliament. They were allowed 24½ million gallons per day. They had been taking upwards of 40 million gallons; and it was said that a large portion of this water had gone, not to improve the supply of the consumers, but to make up the deficiency caused by leakages in the mains of the Company, which leakages had greatly damaged or destroyed the roads under which they occurred. The Queen's Bench Division of the High Court of Justice had, on the application of the Thames Conservancy, granted an injunction against the Company, forbidding them to continue taking this excess of water from the Thames, but at the same time giving them a year of grace in which they might make arrangements to get out of the difficulty under which they would be placed by the injunction. In clause 4 of the Bill, power was given to the Company to raise and apply such capital as might be necessary to make proper provision for "the obtaining, drawing, impounding, and taking of water from the River Thames (including water from Platt's Eyot), in such quantities as may after the expiration of this Act be required by them." It seemed to him that this was one of the very subjects which would come before the Commission, and that it was not right that Parliament should now step in and direct the Company to apply for an Act which gave them power to take more water from the Thames until they had a decision from the Commission as to whether it was good policy that such additional water should in future be drawn from the Thames. Under the same clause, a duty was imposed upon the Company of next year introducing a Bill to obtain these additional powers; and he did not think it desirable that an expensive contest should go on upon the very subject with which the Commission would be dealing at the same time. He would therefore propose to strike these provisions out of the Bill; and, in order that the Company should not be placed at a disadvantage with regard to their consumers, he would ask that the time in which they might take additional water from the Thames might be extended, in spite of the injunction, to four years instead of two as in the Bill.

The Earl of Morley said that provisions had been inserted in the fourth clause by the Select Committee which were intended as safeguards to prevent the questions in dispute being prejudiced by anything contained in the Bill. He ventured to think it was somewhat late to alter, on the third reading, the drafting of the clause, which had been deliberately arrived at. He was informed that the Conservators of the Thames very strongly objected to the proposed prolongation of time. They pointed out that considerable sums of money had been spent in rendering the Thames navigable for a long distance; and that to take a large quantity of water from the river at certain times rendered it unnavigable. He thought it was of importance that the Company should be bound to come to Parliament as soon as possible, and that the shortest limit of time should be given to them to prepare the works which would obviously be necessary in the future. If the noble Lord would consent not to move the omission of the whole of the first paragraph of clause 4, he (Lord Morley) would be prepared not to insist on the words to which he specially called attention, and would move to omit the words "for the obtaining, drawing, impounding, and taking of water from the River Thames (including water from Platt's Eyot) in such quantities as may after the expiration of this Act be required by them."

Lord Tweedmouth said he was, of course, in the palm of his noble friend's hand in that House, and his best course was to accept whatever was offered him and to be as thankful as possible. He admitted that the suggested amendment would meet one of the points which he had raised; but he was very sorry that the noble Lord had not met him also on the other point. The result would be that next session they would be practically face to face with a prolonged contest between the Company and the various Local Authorities and the other Water Companies with regard to their proposal to take more water from the Thames, at the very time that the Royal Commission was inquiring into the same subject.

The Earl of Morley then moved the omission of the words he had suggested.

The amendment was agreed to; and the Bill was read a third time and passed.

The following further progress has been made with Bills:—

Bill read the first time and referred to the Examiners; Metropolitan Water Companies Bill.

Bills reported: Manchester Corporation Bill and Salford Corporation Bill.

Bills read the third time and passed: Borrowstounness Water Provisional Order Bill, Duntocher and Dalmuir Provisional Order Bill, East Warwickshire Water Bill, Leicester Corporation Bill, Manchester Corporation Bill, and the Southwark and Vauxhall Water Bill.

HOUSE OF COMMONS.

The following further progress has been made with Bills:—

Bills reported: Gravesend and Milton Water Bill, Rhymney Valley Gas and Water Bill.

Bills read the third time and passed: District Councils (Water Supply Facilities) Bill, Gravesend and Milton Water Bill, Metropolitan Water Companies Bill, Tynemouth Corporation Water Bill.

HOUSE OF COMMONS COMMITTEE.

Friday, July 16.

(*Before Sir* W. CODDINGTON, *Chairman, Mr.* H. S. SAMUEL, *Mr.* CUBITT, *Mr.* WARNER, *and Mr.* ALLISON.)

TYNEMOUTH CORPORATION (WATER) BILL.

This Bill, which is to empower the Tynemouth Corporation to acquire the undertaking of the North Shields Water Company, and to supply water in the borough of Tynemouth and adjacent places, came before the above-named Committee to-day. When it was called on, it was announced that, save on one point, all matters in dispute had been settled.

Mr. PEMBER, Q.C, Mr. PEMBROKE STEPHENS, Q.C., and Mr. E. PAGE appeared for the promoters; Mr. BALFOUR BROWNE, Q.C., and Mr. G. FITZGERALD, for the North Shields Water Company; and Mr. WORSLEY TAYLOR, Q.C., and Mr. CLAUDE BAGGALLAY, for Earl Percy.

Mr. *G. Armstrong*, the Deputy-Mayor of Newcastle, and Mayor of the town at the time the necessary meetings were held in connection with the promotion of the Bill, having given formal evidence,

The CHAIRMAN said the Committee found the preamble of the Bill proved.

Mr. G. FITZGERALD then made application, under the Costs Act, that the Corporation should be directed to pay the costs of the Water Company in appearing not only before the Committee of the House of Lords but before the present Committee, in opposition to the Bill; this being the sole remaining point upon which the Company were at variance with the Corporation.

A discussion of some length followed, in the course of which

Mr. FITZGERALD said the heads of the agreement between the Company and the Corporation were as follows:—

1.—To substitute "Lands Clauses Acts" for the "Arbitration Act, 1889," in clause 6, which is to stand in other respects as altered in the filled-up Bill.

2.—To give the Company reasonable costs of the winding up of the Company and of the transfer of the undertaking; the amount, in case of dispute, to be settled by the Clerk of the Peace for the County of Northumberland, or, him failing, by the District Registrar of the High Court at Newcastle.

3.—To except the Company's reserve fund and book debts from the undertaking to be acquired.

4.—To delete clause 19; providing in lieu thereof that the Corporation shall employ the Secretary (Mr. Clarke), and the foreman (Mr. Ingram), and on their dismissal, otherwise than for misconduct, shall continue to them half their respective salaries for the remainder of their lives.

5.—To give the Company access to the books of account (acquired as part of the undertaking) until the Company is wound up.

6.—The Company to be at liberty to raise the question of the payment of costs of opposition to the Bill in both Houses of Parliament before the Committee.

The room was then cleared. On the re-admission of the public,

The CHAIRMAN said the Committee had decided not to allow costs.

The adjustment of the clauses was thereupon proceeded with; and the Bill, as amended, was ordered to be reported.

LEGAL INTELLIGENCE.

SUPREME COURT OF JUDICATURE—COURT OF APPEAL.

Wednesday, July 28.

(*Before the* MASTER OF THE ROLLS *and Lords Justices* SMITH *and* RIGBY.)

South Staffordshire Water-Works Company v. Barrow.

This was an appeal from the decision of Mr. Justice Lawrance on April 14 last,* whereby he held that the plaintiffs were only entitled to charge the defendant, who resides at Winshill, near Burton-on-Trent, a water-rate based on the net annual value of his house, and not, as they contended, on the gross value. It will be remembered that the Company, by their Act of 1853, were empowered to charge on the annual value of the premises supplied, which since the decision in the Dobbs case, means the net annual value. The Burton-on-Trent Water Company, by their Act of 1861, were empowered to charge on the rack-rental. In 1866, the two Companies were amalgamated; and by the same Act the district within which the respondent's house is situated was included within the limits of supply. The appellants contended that they might, at their option, exercise within the added district the powers of rating conferred by either Act, and were therefore entitled to charge on the rack-rental. For the respondent it was submitted that, the words of the section in each case being "not exceeding" a certain amount, the Company could only exercise the power of rating on the lower scale, which was the only way of carrying out the provisions of both Acts.

Sir R. T. REID, Q.C., and Mr. LESLIE, appeared for the appellants; Mr. CHANNELL, Q.C., and Mr. DUKE represented the respondent.

The MASTER of the ROLLS said he had come to the conclusion that the judgment of the learned Judge must be affirmed. The question was with regard to this new district, which was not in either of the old Acts, and what "toll" the Company were empowered to impose in respect of water supplied within that district. The relation between the parties was not that of a contract, to which both had agreed. They stood in the relation of one having the right to demand a supply of water for his premises, and the other (the Company) having a right, if he demanded a supply, to charge him what the Act of Parliament gave them power to charge, though he did not agree to it, and might fight against it to the utmost. What then, was the toll which, within this new district, the Company were entitled to impose? He had heard on both sides very ingenious and intricate arguments, the result of which was that he had no more idea which of the two tolls ought to be imposed than he had of anything else in the world. It brought his mind to this; and, if it were not for the existence of another doctrine, he should say the only way to decide the matter would be to throw dice, or toss up a penny, for it was left as ambiguous as anything he had ever seen. This being so, as this was a toll, and the amount of it was left absolutely ambiguous, what rule must be applied? Where power was given to a Company to impose a toll on a man contrary to his wishes, if it were left ambiguous which of two tolls they had power to impose, the Court must decide in favour of the least onerous on the person supplied. This was the doctrine laid down by Lord Tenterden and the other Judges in the case of *The Proprietors of the Stourbridge Canal v. Wheeley;* and he entirely agreed with it, and must apply it to this case. The Acts being ambiguous, the Company could only impose the lower of the two tolls. On this ground, the judgment must be supported.

Lords Justices SMITH and RIGBY agreed.

The appeal was therefore dismissed.

* See "JOURNAL," Vol. LXIX., p. 891.

The Incandescent Gas-Light Company's Patents.

On Saturday, Mr. Justice Kekewich, in the case of *The Incandescent Gas-Light Company, Limited, v. Altmann*, which came on as a short cause upon motion for judgment in default of defence, granted an injunction restraining the infringement of the Company's patents, and certified for particulars of breaches. Similar orders were made by Mr. Justice Romer, at the instance of the Company, against the following defendants: Storey, Coathupe, Armfield, Hooker, and the Improved Sunlight Incandescent Company.

A Question as to Laying Pipes and Wires in Montreal.

Last Wednesday the Judicial Committee of the Privy Council, consisting of Lords Macnaghten and Morris, Sir R. Couch, and Sir H. Strong, had before them an appeal from a judgment of the Court of Queen's Bench for Lower Canada, dated Oct. 3, 1896, affirming a decision of the Superior Court of Quebec. The suit had reference to the right of the Standard Light and Power Company to lay underground wires in the city of Montreal. The Company alleged that by an Act of the Provincial Legislature they were empowered, among other things, to lay their wires and pipes underground for the purpose of supplying electricity and gas for light, power, and heating, subject to certain regulations; and that, having failed to obtain from the Municipality of Montreal any directions as to the manner of opening the streets in that city, they commenced the works at large expense and labour. The Municipality, as they asserted, interfered with their operations, and used force to drive their servants from the streets; thus occasioning much loss and damage, besides involving the Company in very heavy expense. The Municipality, on the other hand, alleged that, the property in the streets of the city being vested in them, the respondents were not entitled to break up or interfere with those streets without their consent; and they were justified in preventing them from making the excavations and laying down the underground wires and pipes. The Courts below decided in favour of the respondents. Sir Edward Clarke, Q.C., Mr. L. J. Ethier, Q.C. (of the Canadian Bar), and Mr. J. R. Paget were Counsel for the appellants; Mr. Haldane, Q.C., and Mr. R. C. Smith (of the Canadian Bar) represented the respondents. At the close of the arguments for the appellants, Lord Macnaghten intimated that if their Lordships desired to call upon the learned Counsel for the respondents they would be summoned on another occasion. Otherwise, their Lordships would take time to consider their judgment.

The Settlement in the Automatic Gas-Retort Case.—In virtue of the arrangement come to between the Salford Corporation and the Automatic Coal-Gas Retort Company, to which reference was made in our editorial columns last week, representatives of both parties attended in Court last Wednesday, and Mr. Walter announced that the appeal of the Corporation had been withdrawn.

The Porthcawl District Council and Water Diviners' Fees.—Some time ago the Porthcawl District Council incurred expenditure to the extent of about £400 in connection with the provision of a water supply for the town. This not being very successful, they obtained the sanction of the Local Government Board to a loan of £250 for experimental purposes. The money was, it seems, spent principally on a water diviner. The Council selected a spot, and commenced sinking; but, the funds running short, they applied for permission to contract another loan for £400. When Colonel Luard held an inquiry on the matter, it came out that the previous £250 had been spent as above mentioned. The Local Government Board thereupon wrote to the District Council, and condemned their proceedings. The Council nevertheless went on with their enterprise, and sank another 65 feet; the total amount spent being something like £800. When the annual audit came round in April last, a ratepayer protested against the whole action of the Council; and his determined attitude led to the adjournment of the audit. It was resumed last Saturday week, when Mr. Vachell, Solicitor, appeared for a number of ratepayers to object to, among other items, the fees of the water diviner. Mr. Dolby, the Auditor of the Board who was conducting the inquiry, said he had decided to surcharge the Council with the sum of £17 1s., which had been expended consequent upon the water finder's advice. The inquiry closed on Thursday, when, after the production of the correspondence with the Local Government Board, Mr. Dolby said the Council had illegally paid fees to a person supposed to be possessed of supernatural powers, and on his advice had spent several hundred pounds. This action was not sincere and *bonâ fide*, and involved waste of public money. He disallowed the whole of the expenditure, less the £250 granted as a loan for experimental purposes.

MISCELLANEOUS NEWS.

THE COMBINED ACTION AMONG SULPHATE OF AMMONIA MANUFACTURERS.

The Committee Formed—A Successful Start.

In furtherance of the project to form a Committee of the Sulphate of Ammonia Manufacturers of the United Kingdom, for the purposes set forth in the circular published in the "JOURNAL" for April 20 last (p. 892), a meeting, convened by Colonel S. A. Sadler, was held last Thursday at the Cannon Street Hotel. Mr. W. G. BLAGDEN, of The Gaslight and Coke Company, was called upon to preside.

The CHAIRMAN, in opening the proceedings, said he thought it would be useful if he were to recall to the minds of those present the circumstances under which the scheme was started. At the instance of the Sulphate of Ammonia Association, a deputation from that body met several of the large makers of sulphate of ammonia outside the Association; and they held a conference in London some months ago. On that occasion, the position and prospects of sulphate of ammonia were reviewed, particularly in their relationship to nitrate of soda; and, after full consideration, it was decided to form, in the interests of the trade, a Sulphate of Ammonia Committee on similar lines to the Permanent Nitrate Committee. An influentially signed circular, dated April 17 (which all present had probably read), was sent to every sulphate of ammonia manufacturer in the United Kingdom. This circular set forth very fully the objects the Committee had in view. The scheme had been cordially adopted by the large majority of makers, who had agreed to contribute not exceeding 6d. per ton on their annual production. [The Chairman here read a list of the manufacturers who had signified their adherence to the scheme, a large proportion of the names being those of Gas Companies.] Continuing, he said there were several other makers in addition to those named in the list who were favourably considering the question. The total quantity of sulphate of ammonia represented by those who had already given in their names was about 130,000 tons out of a total annual make in the United Kingdom estimated variously from 180,000 to 190,000 tons. Before proceeding farther, he thought perhaps it would be well for him to call attention to the suggestions made in the circular already referred to. The first was that the money contributed by the subscribers should be applied to the offering of prizes to all agricultural societies in the United Kingdom; secondly, in employing properly qualified travellers and experts to attend markets, agricultural shows, meetings of agricultural societies, chambers of commerce, &c.; and thirdly, in engaging eminent chemists and agriculturists to conduct special experiments to demonstrate the merits of sulphate of ammonia compared with nitrate of soda, and to bring the results of such investigation to the notice of farmers and others. The more the gentlemen who initiated this project had gone into it, the more convinced had they become as to the desirability of all these objects; and they were more of opinion now than ever that it was desirable a Committee should be formed, with ample powers to carry out these proposals. The principal object of the present meeting was to appoint an Executive Committee, who would have full power to select officers, and to spend such money as they might call upon the contributors to subscribe, but not exceeding 6d. per ton.

Mr. ISAAC CARR (Widnes) said he understood the original circular was sent to all the sulphate of ammonia makers in the United Kingdom; and it would be interesting to know at this point the number of refusals that had been received.

Colonel SADLER replied that he gathered from the list before him that there had been five actual refusals. He might say that circulars had been sent to everybody whose name appeared in the official list; the number issued being 400. He had not received anything like 400 replies; but he found a good many of the names that were on the list were only either very small makers indeed, or were dealers who were interested in an indirect way with sulphate of ammonia manufacturers. The fact that they had received favourable replies from the producers of something like 130,000 tons a year out of a total make in the United Kingdom of 180,000 tons, would give some indication of the number and position of those who had joined the Committee. Some of those who had not replied might be construed into refusals; but as regarded those who had actually refused, there was only one large firm who had not seen their way to join. In addition to the names read out, a considerable number of firms were waiting to see the scheme launched (as they called it) in a more definite form than at the present time. He was quite of opinion that, within the next few weeks, they might see an additional 10,000 tons added to the list already submitted. The Committee had been considering the question of representation on the Executive Committee; and it was proposed to give the Executive plenary powers to do what they thought fit. The proposition he had to submit was—"That an Executive Committee be appointed, with full power to appoint officers, to take such steps as they think fit in the interests of sulphate of ammonia manufacturers, and to levy subscriptions, as required, on members not exceeding in the whole 6d. per ton during the ensuing year." It might be, Colonel Sadler added, that 6d. per ton would not be required, nor perhaps 3d. His own feeling in the matter was that they should move slowly and surely—not plunge into water in which they could not hold their own. It might be possible to work the initiatory stages of the Committee so as not to be a very costly thing. In preparing the list of proposed members for the Committee, they had had due regard to the representation of gas companies, corporations, oil-works, shale-works, coke-ovens, and all the industries from which sulphate of ammonia was obtained. The proposed list was as follows: Messrs. Fraser, Kennedy, Fyfe, Colonel Sadler, Messrs. Orr, Craven, Dempster, Blagden, Lennard, F. Livesey, Brotherton, Hanbury Thomas, Alderman Miles, Messrs. Brunner, Mond, and Co., and the Bradford, Salford, Leicester, and Nottingham Corporations. This would give them eighteen members, who would make a very representative Committee.

Mr. R. DEMPSTER (Messrs. R. & J. Dempster) said he should like to add the name of Mr. Isaac Carr, who had been connected with the late Sulphate of Ammonia Association, and had an intimate knowledge of the sulphate business. He thought Mr. Carr would be a great acquisition to the Committee.

Mr. E. A. HARMAN (Huddersfield) seconded the motion.

The resolution and Executive Committee proposed by Colonel Sadler, with the addition of Mr. Isaac Carr, was then unanimously adopted.

Colonel SADLER said he was sure those present would have ideas in their minds as to the programme that should have the attention of the influentially constituted Committee which had been appointed; and he, for one, having been elected a member of that Committee, would like to have the views of the various contributors as to the best mode of encompassing the work they had in hand. The main mission they had in front of them was to do all they could to see that the nitrogen value of sulphate of ammonia realized as good a price as the nitrogen value of nitrate of soda. That day's price of nitrate of soda was £7 10s. per ton; and the unit nitrogen value of that article was 9s. If they applied the unit value of 9s. to the nitrogen contained in sulphate of ammonia, that day's price of the latter would be £9 10s. per ton. This represented a prodigious loss to the sulphate trade. Speaking as a chemist, he saw no difference, and he knew of no difference, between the nitrogen value of sulphate of ammonia and the nitrogen value of nitrate of soda. They were that day selling their sulphate of ammonia at a nitrogen value of 7s. per unit; while the sellers of nitrate of soda were obtaining 9s. per unit. This was a condition of things which he was perfectly satisfied could be easily remedied, if the Committee did their work in a systematic, methodical, and thorough manner. Consumers of sulphate of ammonia, or those who should be consumers, would soon get to know what was the intrinsic merit of the nitrogen it contained. Unfortunately for the sulphate of ammonia producers, they had had opponents in the Permanent Nitrate Committee with great wealth behind them, and with great enterprise to back it up. They had made (he would almost use the words) the most extraordinary and mendacious statements as to the superiority of the nitrogen contained in nitrate of soda as opposed to that contained in sulphate of ammonia. Pressed as they were at the present moment by over-production, and the difficulty of finding an outlet for their product, they were "at it again" in the most virulent form. Statements were being circulated broadcast in this country and abroad, pointing out the alleged superiority of nitrate of soda over sulphate of ammonia. He hoped the Committee would follow—at any rate, roughly—on the lines of the programme that was submitted to the sulphate of ammonia makers in the circular sent out in April. It seemed to him that they wanted some eminent expert or scientist to demonstrate, in a popular form, that the nitrogen value of their product was equal to the nitrogen value of nitrate of soda. If they had the funds which they hoped to get, and would get now, the Committee would bring such statements to bear, circulate such literature, and take such steps as would, he hoped, in a few months, show the consumers that the cheapest, best, and most useful form of nitrogen was to be found in sulphate of ammonia.

Mr. ROBERT ORR (Glasgow) remarked that he had no doubt the work of the Committee would result in sulphate of ammonia being properly appreciated by the farmers of this country.

Mr. HANBURY THOMAS (Sheffield) said Colonel Sadler had made the remark that, at the outset, the Committee would probably not require very much money. He (Mr. Thomas) thought that was a mistake; and they ought not to allow the subscribers to think they would not need the full 6d. per ton in the first year. The work ought to be done thoroughly; and they should not stick at expense in getting first-class men to draw up pamphlets for circulation. Then as to the advertising, if it was not done well and largely, they might just as well leave it alone. The advertising ought to be as permanent and put forward as prominently as was done in the case of nitrate. In his opinion, as a member of the Committee, they would want the 6d. per ton that had been suggested.

Mr. R. DEMPSTER said he was of the same opinion as Mr. Hanbury Thomas, that if their work was worth doing at all, it was worth doing well; and 6d. per ton of sulphate produced was the least they should estimate as the cost of carrying it on. His first idea was that the subscription should be 1s. a ton, which would have given them £5000 or £6000 with which to carry on their operations. Sixpence per ton on the amount of sulphate produced by the makers who had joined them, would, he supposed, represent something like £3000. [Colonel SADLER: £3250.] Of course, on that amount they could do the thing very well; but he did not think they could do anything on the lines of the Nitrate Committee, because, at 1s. a ton of nitrate the contribution would be something like £26,000. Their own £3000 or £4000 was, in comparison, very little; but, of course, the quantity of sulphate they had to sell and the quantity of nitrate their opponents had to sell were two different things. It was a question whether in a year or two, they could not get the German and French producers to join them, because it was as much to their interest as to that of English makers that sulphate should obtain a better price. Their price, he understood, was regulated by the London price, with the carriage added; and therefore he should not be surprised to hear that they would be glad to join the Committee.

Mr. FRANK LIVESEY remarked that they were not likely to get another meeting so representative of the industry as that one for some time; and the Committee would like to hear further opinions as to the proposed subscription of 6d. per ton.

Colonel SADLER said, at the risk of being a bore, he should like to say that one of the most excellent ways of spending their money that he knew of was to offer money prizes to local societies. Within the last three months, in connection with a Society in his own district, the Permanent Nitrate Committee offered a prize of £10 for the best-grown crops. The Society met, and for five hours talked of nothing but nitrate of soda, and its effects on the different kinds of crops they grew. In all the local papers, there were full, glowing accounts of what had been done by nitrate of soda; and it was one of the finest advertisements an article of the kind could have. He was sorry to say the Chairman of that Society, who was a sulphate of ammonia manufacturer, had not the courage to say one word in favour of the article in which he was interested.

Mr. F. J. R. CARULLA (Derby) remarked that, in the list read by the Chairman, he did not notice the names of iron-works; and he asked if he was right in that. It was through the iron manufacturers that sulphate of ammonia had come down so much in price, owing to the enormous make they had put on the market. If they did not get them to follow in the lines of the gas manufacturers (who had so nobly responded to the proposition), it seemed to him they would not do very much good. There

were also some very noted chemical manufacturers who were not included; but perhaps they were among those whom it was hoped to bring into line. One speaker had said the Committee should follow on the lines of the Nitrate Committee in regard to their action. He would be excused if he said that they should not follow too slavishly in their footsteps. They were certainly making a mistake in attacking sulphate of ammonia unfairly, as they were doing and had been doing all along; and he did not think the Committee should copy them in that respect. The farmers were not such a set of fools as not to see that. Those who studied the matter would say: "Lies are being told on this subject. The nitrate of soda people tell us that sulphate of ammonia is no good; and now the sulphate of ammonia people are saying that nitrate of soda is no good. Let us go back to our muck." Having referred to the paper which he lately read before the Iron and Steel Institute, Mr. Carulla said that nitrate of soda had a good many disadvantages that had not been put forward. For instance, it was a dangerous article in case of fire; and this he did not think had ever been publicly brought out. Statements of that character should, he thought, be put forward as prominently as possible. Then, again, some of the so-called friends of sulphate of ammonia did not tire of pitching into sulphate of ammonia manufacturers by saying that they should be extremely careful to make it as pure as they possibly could, as if it was not pure at the present day! The knowledge of such people was derived from old text-books, written at a time when sulphate of ammonia was made by neutralizing or saturating gas liquor directly, and then evaporating the whole to get cyanides and all sorts of things from the salts. At the present time, there was not a sulphate of ammonia manufacturer who made his salt in that fashion. Only a short time back, a pamphlet was printed, in which they were told that the farmer must take care he did not get cyanides in his sulphate of ammonia; but, of course, this was ridiculous at the present day. It must be shown that they were makers of a pure article—sufficiently pure for all practical purposes.

Mr. Orr asked permission to reply to Mr. Carulla's question as to iron-works. In the total production of 130,000 tons of sulphate of ammonia, the quantity represented by Scotch iron-works was 6800 tons; by the Mineral Oil Association of Scotland, 40,500 tons; and by the gas-works of Scotland, 1100 tons. He thought they could improve upon the last-named figure by making personal application to several of the Scotch gas companies to send in their allegiance; and he hoped they would be able to do something more with the iron-works. Two of the largest iron-works had declined to join them; and they represented about 7500 tons. He thought they should get those two works into their ranks, as the object of the Committee was so thoroughly educational. It was not a syndicate or a "corner," or anything that was pernicious in commercial life. Their object was simply to cause the farmer to see that he could improve his position by using a home article instead of a foreign one.

Mr. E. A. Harman said they had elected an Executive Committee to deal with a matter of widespread interest; and he thought the main point those present had to consider was that of strengthening the hands of the Committee as far as possible by giving them to understand that the sulphate of ammonia manufacturers were at their backs in all they undertook. Mr. Livesey had suggested that the question of the subscription per ton should be discussed by the meeting; and he (the speaker) thought that was probably one of the principal points for their consideration. Other matters might be dealt with by the Committee as they deemed fit. It seemed to him that what was worth doing at all in this direction was worth doing well; and to suggest anything beneath 6d. per ton would make a paltry matter of it altogether. He thought it was desirable that they should ignore the action of the Nitrate Committee, and act on independent lines to a certain extent. Suggestions might be forthcoming in large number from subscribers outside that meeting; and they should be given to understand that proposals from them would be readily received and considered by the Committee.

Mr. Isaac Carr pointed out that, if the subscription was fixed at 6d. per ton, in the case of The Gaslight and Coke Company, with their make of 20,000 tons a year, their annual subscription would amount to £500; while there were many other makers whose subscriptions would not come to £1. At the first glance, this looked like a hardship for the large makers; but the fact must not be lost sight of that the benefits that would accrue from this Committee were proportionately greater to the larger manufacturers, and were in strict proportion to the amount they would pay for their larger makes. Regarding the formation of the Committee and the work they were proposing to do, it should be borne in mind that up to the present time practically nothing had been done to forward the interests of sulphate of ammonia. The work of the old Sulphate of Ammonia Association had been to keep the members apprised of the state of the market, and to circulate a small amount of literature; but as for actual work such as the Permanent Nitrate Committee had undertaken, the Association had done simply nothing. He had one of the circulars of the Nitrate Committee in which there were some extraordinary figures relating to the working of nitrate of soda, with and without other manures; and in the list they showed that increases of from 133 to 19 per cent. in crops had been obtained, and which increases it was claimed were practically due to the use of nitrate of soda. When literature of this kind was placed in the hands of a farmer, and he saw these immense increases were attributed to nitrate of soda, that was the thing that appealed to his pocket, and must cause him to go in for the use of nitrate. If the nitrate people could produce results such as these, surely they with sulphate of ammonia should be able to produce something equally good, or even better. Taking the present price of sulphate of ammonia, or the cost per unit of nitrogen, the expense of bringing about these results should be much lower. He was glad a previous speaker mentioned that this Committee was purely for educational purposes. Colonel Sadler had stated that many sulphate of ammonia makers were holding aloof until the Committee was fairly launched. He (Mr. Carr) felt that many were holding aloof because they fancied it was a sort of combination to rig the market or form rings in prices, and not altogether a legitimate thing. The Committee could not hold it out too strongly at this initial stage that this was not the intention; but that what they proposed to do was fair and honest, and in the best interests of sulphate of ammonia.

The Chairman said he gathered from the observations that had been made by the various members that the general opinion was that the Committee, as soon as they got to work, could not do better than spend the 6d. per ton; and on the part of the Committee, he might say they would do their best to lay out the money in the most advantageous manner. Mr. Dempster made reference to the German and French producers of sulphate of ammonia, and suggested that it might be possible to bring them into line with themselves. So far as the French makers were concerned, there was small chance of doing that. They had an easy outlet for their sulphate and a high price compared with this country. Then in Germany he believed there were two Associations similar to the one they were creating that day. They not only produced propaganda for the article, but to a certain extent they attempted to regulate the price, which the Committee would not do. But if they put themselves in communication with those Associations, they might perhaps be able to work in some way with them. In reference to Mr. Carulla's question as to the iron-works, Mr. Orr had answered it; but he might add that the Committee would use their best endeavours to get the iron manufacturers to join.

On the proposition of Mr. W. Fraser, seconded by Mr. Carulla, a hearty vote of thanks was passed to Colonel Sadler for his untiring efforts in promoting the scheme.

Mr. Blagden, who was also cordially thanked for presiding, undertook to relieve Colonel Sadler of the duties of Convener.

The proceedings then terminated; and the Executive Committee immediately afterwards met to consider their course of procedure.

THE GASLIGHT AND COKE COMPANY.

The Half-Yearly Report and Accounts.

The following report, with the accounts showing the working of the Company during the six months ending June 30 last, will be submitted to the proprietors at the half-yearly meeting next Friday:—

The accounts for the past half year show that, after providing for all fixed charges, there remains a balance of £366,552 18s. 1d. The amount required for the dividend at the statutory rate of 12¾ per cent. per annum, which the Directors recommend to be declared, is £375,907 12s. 3d.; and it will therefore be necessary to have recourse to the reserve fund, which has been accumulated for the purpose of equalizing the dividends, to make up the difference—£9354 14s. 2d.

The unsatisfactory feature in the accounts for the past half year is the further reduction in the returns for residual products, principally in the items of tar and ammoniacal liquor products. It would appear, from the continued fall in the prices of some of the more important of these products during the past few years, that, for the present at least, production has overtaken demand. It is, however, satisfactory to observe that the exceptionally low prices of sulphate of ammonia which have ruled during the past three years have stimulated the demand for this material, and that it is now being largely purchased in place of nitrate of soda.

The Directors have great pleasure in being able again to report a most satisfactory increase in the sale of gas. Notwithstanding the fact that the past half year compares with the first six months of a leap year—1896—there has been an increase of 7 per cent. in the sale of gas. The actual quantity sold for the past half year was 10,543,386,000 cubic feet, which compares with 9,852,694,000 cubic feet in the June half year of 1896; showing an increase of 690,692,000 cubic feet. This well-sustained improvement in the Company's business is due largely to the increased use of gas for heating and cooking purposes and to the extension of the supply of gas on the automatic prepayment meter system.

This increased demand for gas necessitates additions to both manufacturing and distribution plant; and the Directors will accordingly apply to the proprietors for authority to create, and to issue as may be required from time to time, "A" ordinary stock to the amount of £150,000, and debenture stock to the amount of £175,000.

The Directors have to report the purchase of the coal required for the current twelve months at prices slightly above those of last year. In view, however, of the improvement in the general trade of the country, they do not consider the small increases in prices obtained by the coal-owners have been unreasonable.

It is with sincere regret that the Directors announce the death of their esteemed friend and colleague, Mr. John Orwell Phillips, who, having held the position of Secretary and General Manager for a period of 32 years, was, in February, 1894, elected to a seat on the Court, where his long experience in all matters connected with the Company was of great value. The Directors have invited Mr. Corbet Woodall, C.E., to join the Court in the place of the late Mr. Phillips. He has consented to place his valuable services and great experience at the disposal of the Company, and he will hold office as Director until the completion of the term for which Mr. Phillips had been re-elected.

The Court of Directors have been furnished by the several Engineers of the manufacturing and distribution departments with the usual certificates respectively to the effect that the Company's plant has been maintained in thorough efficiency.

Accompanying the report are the usual statements of account, from which we extract the following particulars:—

The capital account shows receipts (with premiums, £1,476,950) to the amount of £12,924,950. The expenditure is shown in the following items:—

Expenditure to Dec. 31, 1896		£12,028,092 6 7
Expenditure during the half year to June 30, 1897, viz.:—		
Buildings and machinery in extension of works	£36,148 6 7	
New and additional mains and service-pipes	28,121 9 7	
Do. do. meters	40,140 8 11	
Do. do. stoves	25,923 1 11	
	£130,333 7 0	
Cr. by sale of surplus land	8,241 15 1	
		122,091 11 11
		£12,150,183 18 6
Balance of capital account		774,766 1 6
		£12,924,950 0 0

The revenue and net revenue accounts are given in full below.

The balance applicable for division is £366,552 18s. 1d.; and the statement showing how the Directors propose to appropriate it is as follows:—

June, 1896.			
£164,121 ..	Net balance brought from last account	£45,747	15 1
310,590 ..	Net revenue for the half year	320,805	3 0
.. ..	Amount to be withdrawn from the reserve fund .	9,354	14 2
£474,711		£375,907	12 3
(12¾ per cent.)	A dividend on the ordinary stock—		
£365,813 ..	12¾ per cent. per annum on £5,896,590 . . .	375,907	12 3
£108,898 ..	Balance carried to next account	..	

The three statements relating to the reserve, insurance, and depreciation fund show that the balances on June 30 were as follows: Reserve fund, £132,357; insurance fund, £80,522; depreciation fund, £47,637. The insurance fund had to bear in the past half year a payment of £709 in respect of claims arising out of the explosion of gas in New Church Court, Strand, on Oct. 29, 1895; and a sum of £101, the value of plant destroyed by fire in the Company's district.

The statements furnishing particulars as to working are as follows:—

STATEMENT OF COALS USED, ETC.

Description of Coal.	In Store, 31st Dec., 1896.	Received during Half Year.	Carbonized during Half Year.	Used during Half Year.	In Store, 30th June, 1897.
	Tons.	Tons.	Tons.	Tons.	Tons.
Common . .	234,596	938,887	1,029,043	2,146	142,294
Cannel . .	23,890	14,029	*14,064	3	23,852
Total . .	258,486	952,916	*1,043,107	2,149	166,146

* In addition to this quantity, oil and spirit, the equivalent of 42,102 tons of cannel, have been used during the half year.

STATEMENT OF RESIDUAL PRODUCTS.

Description.	In Store, 31st Dec., 1896.	Made during Half Year.	Used during Half Year.	Sold during Half Year.	In Store 30th June, 1897.
Coke—tons	154,725	633,679	136,648	528,059	123,697
Breeze—tons.	4,183	79,325	30,766	46,842	5,900
Tar—gallons	808,213	10,696,024	10,841,442	17,374	645,421
Ammoniacal liquor—butts	18,980	282,717	269,376	11,266	21,055

STATEMENT OF GAS MADE, SOLD, ETC.

Quantity Made.	Quantity Sold. Public Lights and under Contracts (estimated).	Quantity Sold. Private Lights (per Meter).	Total Quantity accounted for.	Number of Public Lamps.
Thousands.	Thousands.	Thousands.	Thousands.	
*11,253,445	527,197	10,016,189	10,701,406	52,328
†10,521,839	520,788	9,331,906	9,992,610	51,970

* Including 908,546,000 cubic feet of "oil gas."
† June half year, 1896.

The last statement is the general balance-sheet. It shows that the value of the stores on hand on June 30 was as follows: Coals, £96,883; coke, £46,862; tar and ammoniacal liquor products, £133,085; sundries, £243,588—total, £520,418. The figures for the corresponding period of 1896 were: Coals, £91,776; coke, £78,811; tar, &c., £249,278; sundries, £230,780—total, £650,645. The item "automatic meter supplies (fittings account)" amounts to £247,372, as compared with £197,703 in the six months ending June 30, 1896.

DR. REVENUE ACCOUNT. CR.

June Half Year, 1896.		£ s. d.	£ s. d.	June Half Year, 1896.		£ s. d.	£ s. d.
	To Manufacture of Gas—			£1,312,419	By Sale of gas— Common gas, per meter, at 2s. 10d. and 2s. 3d. per 1000 cubic feet .	1,407,658 15 10	
£573,400	Coals, including oil, dues, carriage, unloading and trimming . . .	598,739 0 2			Public lighting and under contracts—		
18,493	Salaries of engineers and other officers at works	13,778 2 10		74,949	Common gas	75 775 5 10	
161,246	Wages (carbonizing) £165,590/9/10			£1,387,368			1,483,431 1 8
15,770	Sundries . . £15,79)/8/9 }	181,380 18 7		£11,633	Rental of stoves	..	13,420 8 3
36,733	Purification, including £16,021/19/9 for labour	33,597 6 7			Residual products—		
	Repair and maintenance of works and plant, materials and labour, less received for old materials,			£203,815	Coke, less £46,143 4s. 0d. for labour, &c.	190,445 3 7	
145,143	£2505 1s. 6d.	152,075 16 6		3,787	Breeze, less £2415 5s. 9d. for ditto	4,116 8 4	
			979,511 4 8	87,291	Tar and tar products	57,748 2 10	
	Distribution of gas—			6 ,859	Ammoniacal liquor and sulphate of ammonia	56,136 13 4	
28,465	Salaries and wages of Officers (including Rental Clerks) . .	30,078 3 2		£353,742			308,446 8 1
50,311	Repair and maintenance of mains and service-pipes	43,596 19 11		£3,989	Rents receivable		3,950 1 6
23,086	Repair and renewals of meters .	24,382 1 9		257	Transfer fees		231 5 0
24,068	Stove fixing, repairs, and renewals	25,665 9 2					
	Public lamps—		123,722 14 0				
17,104	Lighting and repairing	..	16,712 3 5				
	Rents, rates, and taxes—						
4,773	Rents payable	5,542 11 0					
108,213	Rates and taxes	111,001 1 5					
			116,543 12 5				
	Management—						
2,750	Directors' allowance	2,750 0 0					
200	Company's Auditors	200 0 0					
8,759	Salaries of Secretary, Accountant, and Clerks	9,101 19 11					
17,753	Collectors' commission	18,432 16 4					
6,470	Stationery and printing	5,849 11 5					
2,754	General charges	2,940 19 8					
			39,275 7 4				
203	Parliamentary charges	..	502 1 6				
2,191	Law charges	..	2,777 15 3				
5,983	Bad debts	..	6,229 2 10				
	Depreciation fund for works on leasehold lands	..	500 0 0				
12,767	Annuities	..	13,411 3 2				
	Public Officers—						
885	Gas Referees and Official Auditor.	883 15 11					
926	Public testing-stations	696 17 10					
			1,583 13 9				
£1,261,445			1,300,768 18 4				
500,544	Balance carried to net revenue account . . .		508,713 6 2				
£1,761,989			1,809,482 4 6	£1,761,989			1,809,482 4 6

DR. NET REVENUE ACCOUNT. CR.

June Half Year, 1896.		£ s. d.	£ s. d.	June Half Year, 1896.		£ s. d.	£ s. d.
£62,660	To Interest on debenture stocks and bonds, accrued to June 30, 1897 . .	..	62,659 12 6	£524,091	By Balance from last account	417,931 0 3	
74,015	Dividend on the preference stocks . .	74,015 5 0		359,970	Less dividend on the ordinary capital for the half year to Dec. 31, 1896 . .	372,186 5 2	
47,500	Dividend on the maximum stocks . .	47,500 0 0					45,747 15 1
			121,515 5 0	£164,121			
5,779	Interest on temporary loans and sundry funds . . .	3,733 5 8		500,544	Revenue account	..	508,713 6 2
474,711	Balance applicable to dividend on the ordinary stock .	366,552 18 1					
£664,665			554,461 1 3	£664 665			554,461 1 3

SOUTH METROPOLITAN GAS COMPANY.

The Half-Yearly Report and Accounts.

The following is the report of the Directors of the above Company for the six months ending June 30, which, with the accounts for this period, will be presented at the half-yearly general meeting on the 11th inst.:—

Compared with the corresponding half of last year, there has been an increase of 10 per cent. in the quantity of gas sold, probably in part due to the general prosperity of trade. Such times of prosperity, however, as regards gas undertakings, have their reverse side. Raw materials rise more or less in price, and wages tend to increase. On the other hand, the value of residual products usually declines, as the make of these articles—governed as it is by the make of gas—has a tendency to outrun the demand. This, in conjunction with other circumstances, has resulted at the present time in lower prices than ever for coke and ammonia; and nothing favourable can be said about the price of tar.

In addition to this falling off in the receipts for residual products, the rating assessments have been enormously increased in all the outlying parishes where the sale of gas is least profitable, while all the central and thickly inhabited parishes were content with a reasonable advance.

Every fifth year a re-assessment is made in the Metropolis, the profits of one year being taken as the basis for calculating the rateable value for the next five years. If the profits of a company should be below the average, as they were in the case of this Company in 1889, it is argued on behalf of the parishes that the rating should not be reduced in proportion, because the profits of the bad year will not be a fair average for the succeeding five years. This view is perfectly fair, and was agreed to by the Company in 1890. On the next re-valuation, however, it happened that the quinquennial year, 1894, and the first half of 1895 was the most profitable period the Company had ever known. They were able to recoup some of the losses of 1889, 1890, and 1891, and to make reductions in the price of gas. The central parishes met the Company in the same fair spirit as that in which they had been met on the previous valuation; but the outlying parishes acted differently, and based the assessment for the five years on the excessive figures of 1894. The Company appealed to the Sessions, and that Court decided that the figures for the twelve months immediately preceding the meeting of the Assessment Committee in July, 1895, being the latest at that time available, should be the basis; and beyond this they could not go. Consequently, although the Court very considerably reduced the extravagant estimates put before them, they calculated the rateable value on figures greatly in excess of the amount of the divisible profits, and left the Company no alternative but to re-open the question on the figures of 1896-7. This may, if the parochial authorities are unreasonable, involve another appeal to the Sessions; for if the Company acquiesce in the present excessive assessments for the outlying parishes, the central parishes must follow, and the result will be a permanently unfair charge on the consumers. The effect would be that the consumers would have to pay a permanently higher price for gas than would otherwise be necessary. Under any circumstances, however, the shareholders will suffer no loss from the increase in the rating assessments.

In all other particulars, the condition of the Company is most satisfactory. The plant was never in better order; and a large proportion of the employees of all ranks take a real interest in the Company's prosperity, and do their best to carry out the desire of the Directors to deal fairly and considerately towards the consumers.

The recent policy of the Directors not to recommend the payment of full dividends, finds its justification on the present occasion. Had the opposite course been taken, a reduction of dividend must have been made in the two last half years; but paying the dividend due to 2s. 6d. while the price charged has been only 2s. 3d. per 1000 feet, there has been a considerable amount in hand, and no necessity for a reduction of dividend has arisen or can arise unless and until the price is raised above 2s. 6d. per 1000 feet. It is hoped that a rise of price may not be necessary; but should it be otherwise, the price can go up 3d. per 1000 feet, which will bring in over £100,000 a year, before any reduction of dividend need be made. The Directors therefore recommend the same dividend as before—viz., at the rate of 5¼ per cent. per annum.

The accounts accompanying the report are in the usual form. They show that the total amount of capital raised at the end of the past half year was £6,947,916, of which £6,775,783 had been expended—£45,662 in the six months reported upon. The last-named total is made up as follows: New buildings and machinery, £4909; new and additional mains and services, £11,730; meters, £11,979; and stoves, £17,044. The revenue and net revenue accounts are given on p. 280. The statements relating to the reserve, renewal, and insurance funds show that the balances on June 30 were as follows: Reserve fund, £94,075; renewal fund, £16,460; and insurance fund, £44,287. The statements dealing with the manufacturing operations of the Company furnish the following particulars:—

STATEMENT OF COALS.

Description of Coal.	In Store, Dec. 31, 1896.	Received during the Half Year.	Carbonized during the Half Year.	Used during the Half Year.	In Store, June 30, 1897.
	Tons.	Tons.	Tons.	Tons.	Tons.
Newcastle coal.	62,636	423,418	453,167	400	32,487
Cannel coal	1,542	..	81*	..	1,461
	64,178	423,418	453,248	400	33,948

* 253,546 gallons of petroleum spirit used as a substitute for cannel.

STATEMENT OF RESIDUAL PRODUCTS.

—	In Store, Dec. 31, 1896.	Made during Half Year.	Used in the Half Year.	Sold in the Half Year.	In Store, June 30, 1897.
Coke—cwts.*	396,563	5,580,519	1,203,113	4,251,373	522,596
Breeze—yards	9,150	92,221	16,449	82,695	2,227
Tar—gallons	738,130	4,406,741	34,347	4,464,745	645,779
Ammoniacal liquor—butts. .	26,851	137,453	62,489	92,357	9,458

* 1 cwt. of coke about equals 1 sack of 4 bushels, under Weights and Measures Act, 1878.

STATEMENT OF GAS MADE, SOLD, &c.

Description of Gas.	Quantity made.	Quantity Sold.		Total Quantity accounted for.	Number of Public Lamps.
		Public Lights (estimated).	Private Lights (per Meter).		
	Thousands.	Thousands.	Thousands.	Thousands.	
Common .	4,614,227	229,300	4,162,835	4,454,561	20,298

The remaining statement is the balance-sheet, which gives the value of the stores in hand as follows: Coals and enriching materials, £18,603; coke and breeze, £10,998; tar, sulphate, and liquor, £4563; and sundries, £112,720. The figures this time last year were: Coals, &c., £24,286; coke and breeze, £6610; tar, &c., £4846; and sundries, £113,768. A sum of £37,288, workmen's bonuses and savings, has been deposited with the Company; and the total of the officers' superannuation and guarantee funds is £30,278.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Half-Yearly Report and Accounts.

In the report which the Directors of the above-named Company will present to the proprietors at the half-yearly meeting next Friday, they state with satisfaction that the business of the Company continues to increase; upwards of 8 per cent. more gas having been sold in the six months ending June 30 than in the corresponding period of 1896. The results of the working are so accurately shown by the accounts accompanying the report, that the Directors consider it unnecessary to enter into details. While there was an augmentation in the quantity of gas consumed, there was a moderate advance in the price of coal on the renewal of the yearly contracts in March; and coke and ammonia realized lower prices than ever. The total revenue was £83,192; the expenditure, £70,798—leaving a balance of £12,394 to go to the profit and loss account. But, in order to pay the usual dividend, recourse must be had to the reserve fund, which will enable the Company to meet the temporary depression without either increasing the price of gas or reducing the dividend. The Directors recommend the payment of the same dividends as before—viz., at the rate of 5 per cent. on the preference stock and of 5¼ per cent. on the ordinary stock. This will leave the reserve fund at £36,852. With regard to working, there were used in the manufacture of gas 55,863 tons of coal and cannel and 37,720 gallons of carburine. There were 527,323,000 cubic feet of gas produced, of which 501,135,000 cubic feet were sold; 508,829,000 cubic feet being accounted for. The production of residuals was as follows: Coke, 670,356 cwt.; breeze, 12,908 yards; tar, 501,041 gallons; and ammoniacal liquor, 8010 butts. The quantity of sulphate of ammonia produced was 365 tons, practically the whole of which was sold.

TEIGNMOUTH GAS SUPPLY.

The Annual Report on the Gas Undertaking.

Another discussion of the now familiar character respecting the financial position of the gas undertaking took place at the meeting of the Teignmouth District Council last Tuesday. It began as usual with reference to the subject of the coal account; Mr. G. H. Jarvis, who has persistently challenged the administration of the department on this head, accused the Gas Committee of paying an excessive price for Scotch coal, instead of using Newcastle coal which is cheaper, because they owe their coal merchant a bill which they are unable to pay. Mr. T. W. Hutchings protested against these repeated attacks on the Committee. The reason why Scotch coal was preferred to Newcastle coal was that it yielded better results; and the Gas Manager had informed them that with the present plant he could not be responsible for the lighting of the town during the winter months unless they used Scotch coal. This opinion was confirmed by the eminent Gas Engineer who was recently called in to advise upon the administration and improvement of the undertaking. The Clerk read the annual report on the gas-works. The receipts for the year ending March 31 last were £4376, including £2898 for gas-rentals, £700 for public lighting, and £574 for residuals. The expenditure was £3519, and comprised £2193 for coal, £489 for wages, £219 for repairs and renewals, and £224 for distribution. The gross balance of £857 was disposed of as follows: Interest on loans, £359; repayment of principal, £336; balance credited to the gas account, £162. The stock was valued at £211; and the outstanding loans amounted to £8861. Mr. Hutchings remarked that the additional value of the stock as compared with March, 1896, was £172 10s. 7d.; and the loan account at that date was £9197 9s. The balance of revenue would be sufficient, in the case of a company, to pay a dividend of 9 per cent.; and as it was, the undertaking showed a net balance of £162 in addition to an increased value of the stock. It was absurd to say that the gas-works were in a state of bankruptcy. Mr. Jarvis said he believed that if the undertaking was worked by a company it would pay something like 30 per cent., as was done at Dawlish. There was no going away from the facts. The gas cost 3s. 4½d. per 1000 cubic feet, and was sold at 3s. 9d.—a clear gain of 4½d.; and yet they owed a floating debt of £1400 which they could not pay. If they were in a good position, they would be able to pay this money. There was a leakage somewhere. They paid 2s. 6d. per ton more for coals than they need. Teignmouth was the only place in the locality that did not use Newcastle coal. Mr. W. J. B. Banbury said the Gas Committee were doing their best; but they were hampered by the debt. Mr. Jarvis should be added to the Committee. Mr. Jarvis, however, declined to take a share of the responsibility while the debt remained. The report was adopted without further discussion.

Thirlmere Water for Walton-le-Dale.—The water-works of the Walton-le-Dale District Council have been connected with the Thirlmere aqueduct of the Manchester Corporation; and the inhabitants, who have long suffered from a deficient water supply, will be happy in the assurance that their wants in this respect will be properly and permanently met. The water was formally turned on on the 23rd ult.

Newark Corporation Water Bill.—At the meeting of the Newark Town Council yesterday week, Mr. W. Doubleday, the Chairman of the Water Committee, referred to the recent contest in Parliament between themselves and the Nottingham Corporation. He said that although Newark had not obtained all they asked for, they had succeeded in getting protection for their pumping area to a certain extent by keeping Nottingham out of Oxton and Epperstone. He must confess that he felt disappointed when, after an exhaustive inquiry, the House of Commons gave the Newark Corporation the protective clause they asked for, only to have it struck out again after a very brief consideration by the House of Lords. The cost of the Bill and of the opposition to the Nottingham scheme was heavy. But the time for the repayment of the loan to cover the necessary law expenses had been extended from five to ten years, and to meet this, it would probably be necessary to put on an extra rate of 2d. or 3d. in the pound.

ACCOUNTS OF THE SOUTH METROPOLITAN GAS COMPANY FOR THE HALF YEAR ENDED JUNE 30, 1897.

REVENUE ACCOUNT.

To Manufacture of gas—					**By Sale of gas—**			
Coals into store, including cost of petroleum spirit for enriching and including £19,408 11s. 6d. for labour	£235,157	11	7		Lady Day, at 2s. 3d. per 1000 feet	£288,889	14	9
Purification, including £6390 5s. 6d. for labour	11,109	13	1		Midsummer, at 2s. 3d. per 1000 feet	175,009	0	8
Salaries of Engineer and Officers at works	6,736	9	6			£463,898	15	0
Wages (carbonizing)	51,166	10	5		Public lighting and under contracts	32,017	1	4
Repairs and maintenance of works and plant, including £36,911 5s. 6d. for labour, less £1758 8s. 11d. received for old materials	78,279	14	5				£495,915	16 4
		£383,449	19	0	Meters in use: 157,037—			
Profit sharing for 12 months to June 30, 1897	18,562	1	6		Company's meters at rent: Ordinary, 84,465; automatic, 61,269	£15,512	2	4
Less on account December 31, 1896	7,000	0	6		Stoves and fires at rent: Ordinary, 35,012; automatic, 47,578; fires, 7423	13,229	5	9
		11,562	1	6			28,741	8 1
Distribution of gas—					**Residual products—**			
Repair, maintenance, and renewal of mains and service-pipes (labour, £11,111 9s. 4d.)	£16,784	7	2		Coke, less £16,105 12s. 5d. for labour, &c.	£94,799	1	11
Salaries, &c., Officers and Rental Clerks	11,089	7	2		Breeze, less £2692 18s. 4d. for labour, &c.	3,963	2	5
Repair, &c., of meters (£1074 0s. 3d. for labour)	5,995	5	2		Tar, less £397 6s. 9d. for labour, &c.	19,730	16	6
Repair, &c., of stoves (£3088 2s. 9d. for labour)	7,485	2	2		Ammoniacal liquor, less £333 4s. 11d. for labour, &c.	10,697	8	11
Gas-fittings (labour)	2,514	2	5		Sulphate of ammonia, less £864 0s. 5d. for labour, &c.; £3051 7s. 8d. for acid, &c.	8,683	9	11
		43,868	4	1			137,873	19 8
Public lamps—lighting and repairing, including £5551 3s. 7d. for labour		6,413	7	8	Rents receivable		1,582	14 7
					Transfer fees		61	12 6
Rents, rates, and taxes—								
Rents payable	£814	2	10					
Rates and Taxes	27,994	19	3					
		28,809	2	1				
Management—								
Directors' allowance	£1,750	0	0					
Salaries of Secretary, Accountant, and Clerks	2,864	8	3					
Collectors	7,877	18	3					
Stationery and printing	1,709	13	1					
General charges	3,500	18	10					
Company's Auditors	112	10	0					
		17,315	3	5				
Law charges		5,597	15	9				
Parliamentary charges		200	0	0				
Bad debts		1,162	3	10				
Pensions and officers' and men's superannuation and sick funds		4,717	0	9				
Gas Referees and Official Auditor		329	0	11				
Leasehold renewal fund		500	0	0				
Total expenditure		£502,913	18	7				
Balance carried to net revenue account		161,261	12	7				
		£664,175	11	2	Total receipts		£664,175	11 2

PROFIT AND LOSS (NET REVENUE) ACCOUNT.

Interest on temporary loan and deposits	£1,636	10	8		Balance from last account	£145,068	18	6
Interest on debenture stock	21,250	0	0		*Less*—Dividend for half year ended Dec. 31, 1896	143,718	15	0
Balance applicable to dividend on the ordinary stock	140,033	1	9			1,350	3	6
					Amount from revenue account	161,261	12	7
					Interest on Bankers' balances	307	16	4
	£162,919	12	5			£162,919	12	5

THE ASHFORD GAS-WORKS ARBITRATION.

Surveyors' Institution, London—Monday, July 26.

(*Before Mr.* J. SHIRESS WILL, Q.C.)

The proceedings in the arbitration between the Ashford Gas Company and the Ashford Urban District Council, to ascertain the price to be paid by the latter for the Company's undertaking, were opened to-day. The circumstances under which the arbitration was held will doubtless be in the recollection of our readers; but they are set forth in the opening speech of Counsel.

Mr. FREEMAN, Q.C., appeared for the Company; Mr. BALFOUR BROWNE, Q.C., represented the Council.

Mr. FREEMAN, in opening the proceedings, explained how the arbitration had arisen. He said the Ashford Gas Company were promoting a Bill in Parliament to obtain further powers; and the District Council of Ashford had also introduced a Bill to purchase the Company's undertaking. The Purchase Bill came on first; and during its hearing arrangements were made that the Council should buy the undertaking of the Company at a sum "in given equivalent to 24 years' purchase of the maintainable profits of the Company," the amount of such profits in case of difference being settled by arbitration;* the Council also to take over at a valuation the stock-in-trade of the Company, pay £500 towards the cost of their Bill, take over the mortgage and debenture debt, and pay an annuity to the Company's Engineer. The only question before the Arbitrator was what were the maintainable profits. The learned Counsel then described the works, which had been examined by Mr. Stevenson, the Engineer of the District Council, who stated that they were efficient for the present supply. The books of the Company had also been inspected; and there should be no question of figures between them. There were only two matters to which he wished to call attention. Mr. Lass, the Accountant, had worked on a scientific principle; but he had gone on a different basis to theirs, and the consequence was that his figures for repairs were less than usual in these cases. He suggested, therefore, that as the works were in capital condition, the allocation to repairs was not a correct one. Then the gas made per ton of coal was less than it should be according to the ordinary calculation. He believed the average figure was that a ton of coal should produce 10,000 cubic feet of gas; while at their works the production had only been 8952 cubic feet. He mentioned these matters, because they seemed to require explanation. The learned Counsel then dealt with the valuation. From the accounts, it appeared that, deducting all payments, the profits were £2231 18s. 8d.; and this was the sum he asked the Arbitrator to find as the maintainable profits, which, multiplied by 24, would be the amount they claimed.

The following evidence was then called:—

Mr. *W. A. M'Intosh Valon*, J.P., said he had advised the Company in the matter of the application to Parliament, and now with regard to the arbitration. The Ashford Gas Company was founded in 1866, and registered as a limited liability company, to take over from private speculators the works which had supplied the district with gas since 1835. The works had, therefore, been in existence for 62 years, and had in recent years been entirely re-designed and re-constructed. They stand on an area of ground equal to 2 acres 1 rood 30 perches, alongside the South-Eastern Railway Company's line, from which there was a siding into the works. By this means, the coal was taken to the stores and shot in front of the beds, ready for lifting into the retorts. The siding was also used for removing coke and other residuals. The retort-house contained 73 retorts, and one bed unset. These would produce a maximum of 400,000 cubic feet per day. The present maximum make was 208,000 cubic feet, and the average 167,900 cubic feet per day; so that there was a margin of 192,000 feet, or nearly 100 per cent. The coal storage was in proportion to the size of the retort-house, and was also 100 per cent. in excess of the necessary requirements. The condensers were 25 per cent. over the present make. The exhausters were rather larger; being equal to the demands for three or four years hence. The washers and scrubbers were fully equal to the requirements. The purifiers were large enough for the present make; but any increase would necessitate their being enlarged. The Company were arranging to increase them during this or next year; but in view of the Council's purchasing the works, they had agreed to let the matter stand over. There were three gasholders, with a capacity of 225,000 cubic feet. This was larger than the actual requirements of the present time; the daily make being 168,000 feet. The works contained all the best appliances, plant, and machinery for producing gas economically. There were all the necessary buildings; a plant for the manufacture of sulphate of ammonia was completed last year, capable of dealing with the liquor from twice the present quantity of coals carbonized. The site of the works was not covered, and there was ample room for future extension. The Company had 9 miles of mains, and 1250 service-pipes; and there were 176 public lamps belonging to the Company. They had also 1300 meters—1200 in use, and about 100 in stock. There were 205 gas-stoves fixed in the district, and 227 prepayment meters, 86 of which had been fixed this year. Before 1895, the Company had not fixed either stoves or prepayment meters. These had quite revolutionized the sale of gas, and had led to the large increase of 15 per cent. last year. At Ashford, only one-third of the population used gas; while at Ramsgate and Margate, where the prepayment meters were largely employed, two-thirds of the inhabitants were gas consumers. To introduce gas at Ashford, the Company had lately fitted the houses. The Railway Company had large shops there; and there were many working people not able to afford the cost of gas-fittings. The Company had fitted 207 houses, at a cost of nearly £5 per house. The increase in the sales of gas last year had been 4,569,100 cubic feet, or 13·29 per cent.; and of this he estimated that 2,759,000 cubic feet was due to the introduction of stoves, and the balance to the prepayment meters. In his opinion, 1897 showed the minimum available profits. The price of gas in 1884 was 3s. 9d. per 1000 cubic feet; but this had been gradually reduced to 3s. 1d., which was the present rate. This price was a low one, and compared favourably with the rates in other towns similarly situated as to coal supply. The capital of the Company was

* The Committee proceedings have been reported in the "JOURNAL," Vol. LXIX., pp. 598, 721.

£28,500; and the value of the works, £28,727, or rather more than the whole capital. The dividend paid from 1866 to 1893 averaged 7 per cent.; but since 1894, the Company had paid 10 per cent. They could have paid a larger dividend; but they preferred to improve the works. All the plant and works were in good order; and at the request of the Council their Engineer (Mr. Stevenson), and later Mr. W. R. Chester, had made an examination, and expressed themselves satisfied. The books had been examined by Messrs. Alfred Lass, Wood, and Co., and witness produced several tables founded on their figures. During last year, the quantity of coal carbonized was 4809 tons; and the gas sold, 39,107,600 cubic feet, or an average of 8132 cubic feet per ton. The cost of coal per 1000 cubic feet of gas was 1s. 11d., and the value of the residuals nearly 1s.—making the net cost 11·47d. Working expenses came to nearly 1s. 2d.; and the cost per 1000 cubic feet of gas sold for coal and working expenses, was 2s. 1·42d. The average cost for the six years was 2s. 0·85d. Taking these figures as the basis, witness made his valuation. For the year 1897, the gas, meter, &c., rents were £6362 1s. 8d. The expenditure, on the average of 2s. 0·85d. per 1000 cubic feet, would be £4049 5s. 4d.; leaving a balance of £2312 16s. 4d. To this he added £214 10s. 10d. for surplus works, and £16 11s. 6d. for fittings profit—making a total of £2543 18s. 8d. From this he deducted £312, interest of mortgages to be taken over by the Council; and he estimated the maintainable profit at £2231 18s. 8d. At 24 years' purchase, this would be £53,566 8s., which was his valuation. With regard to the surplus works, he considered that the value of the plant and land beyond the present needs was £5149; and the fittings profit he estimated, on 5 years' purchase, at £397 16s. Both these sums he had divided by 24, to get the annual value. In his opinion, the profits must increase. There was a large margin in the economy of production; and the use of stoves and slot meters must add to the consumption. The works had been kept in the best order; and the structural value was more than the Company's capital.

Cross-examined by Mr. Balfour Browne, witness said the maximum daily make of gas was 208,000 feet. This quantity was made on one day last year; but the average was 167,900 cubic feet. In his opinion, the gasholders were of ample capacity. They should be large enough for a full day's make. In some new works, the storage capacity was 50 per cent. over the make; but in Ramsgate it was only 60 per cent. of the day's make, and generally throughout the country it was under the maximum day's production. It was certainly more comfortable to have a margin. He knew there were a number of houses belonging to the South-Eastern Railway Company; but he was not aware that the Railway Company supplied gas to their workmen. He understood there was a district in Ashford, called New Town, entirely the property of the South-Eastern Company.

Mr. Balfour Browne questioned the witness closely on the last year's increase, which was 13·27 per cent.—remarking that in no other year was it so great; and he quoted the figures from 1891 to 1896, to show that the average increase had been only 2·62 per cent. He asked witness if he had looked at the question of pressure.

Witness replied that he had not.

Mr. Balfour Browne: Would it be possible for an expert gas manager so to raise the pressure as to increase the consumption?

Witness: I never heard of such a thing.

But would it be possible, if he increased the pressure and was careless of leakage?—I hardly think so. It was certainly not done by us.

Perhaps you have not sold gas-works?—Yes, I have; and bought them, too.

I see, in your revenue account for 1896, the year's profit is put down as £1907 6s. 3d., or, deducting £320 for interest on mortgages, £1587. You did not earn 10 per cent. for that year. How did you pay it?—I suppose the balance was taken from the reserve fund.

I see in your valuation you have taken the receipts of one year—1897—and deducted as expenditure the average of six years. Do you think that quite fair?—Yes, especially when the expenses fluctuate from year to year. Most gas-works, witness added, paid the dividend on an average. In good times they put away money to pay for bad years.

Witness (in further cross-examination) said a fair figure to allow for repairs of works and mains, not necessarily in this instance, but in any case, would be from 4d. to 5d., not from 5d. to 6d., per 1000 cubic feet. In the case of suburban companies, the figure, according to the returns for 1894, was 6d.; for 1895, 5·82d.; and for 1896, 5·43d.—an average of 5·75d. But the suburban companies paid more than any others for labour and material. For provincial companies—and the Ashford Company was a provincial company—the figure was just over 5d. per 1000 cubic feet. He treated the profits on the gas-fittings differently to those from gas. He took the present value of this profit at five years' purchase; and having arrived at the present value, he spread it over 24 years. He admitted that a portion of the item of £159 in respect of shop-fittings, &c., in High Street had been allowed for under stock.

Mr. Balfour Browne: The balance of profit and loss account shown in the accounts for 1897 is less than the profit you bring out?

Witness: It must be; you are wanting the maintainable profit.

Are you aware that 1897 is the best or second best year the Company has ever had?—Yes; and so it ought to be. Look at the enormous increase that is taking place; and next year it will be better still.

Mr. *Thomas Newbigging*, M.Inst.C.E., examined by Mr. Freeman, said he had closely examined the accounts of the Ashford Gas Company from 1892 to 1897 inclusive. Those for the year ending June 30, 1897, showed a balance of profit on gas manufacture, including meter and other rents and residual products, of £2220 4s. 5d., and of £79 10s. 8d. on fittings account. He did not think these figures represented the maintainable profit. Before that could be determined, certain adjustments or modifications would have to be made. The adjustments would be required in the two items expenditure on coal and cost of repairs and renewals of works and plant. The sum alleged to have been spent on coal would have to be reduced; and that laid out on repairs and renewals would have to be increased. This, however, would involve the introduction of hypothetical figures, which it was desirable to avoid. Instead of doing this, he preferred to take, like Mr. Valon, the average cost of coal and working expenses for the last six years, and apply that to the output of the last year. The works were in good condition now; and he thought he might attribute a long life to them. The figure of 5d. per 1000 cubic feet of gas sold was frequently taken as representing the average cost of repairs and renewals; but everything depended on the character of the works. According to Mr. Lass's tables, the figure for the Ashford works was 3·44d.; but if a proper calculation had been made, he thought it would have been something over 4d., which, having regard to the substantial character and the condition of the works, he held to be ample. He made an allowance in respect of the purifiers, which he deducted from the excess plant. In arriving at the maintainable profits, he took the sale of gas last year at 39,107,600 cubic feet, and multiplying this by 2s. 0·85d., the average cost of coal and working expenses, less residuals, per 1000 cubic feet of gas sold for the six years from 1892 to 1897, they had £4049 5s. 4d. as the total working cost. This sum deducted from £6362 1s. 8d., for gas, meter, stove, and prepayment fittings rental for the year to June 30, 1897, gave £2312 16s. 4d. as the maintainable profit on the gas manufacture. As to the excess works, he did not divide their value by 24, but found the profit which the amount of capital invested in them would make, and claimed for that. In this way, he valued the excess works—the retort-house and retort-benches, coal-store, gasholders, sulphate works, and land—at £4832. But from this he deducted £600 for the renewal and enlargement of the purifiers, which were only barely sufficient for the present make—leaving £4232 for works in excess. The total structural value of the works and plant he put at £27,535, which, less the £4232, gave £23,303. As the profit had been earned by plant and works of this value, it became a simple rule of three sum to ascertain what profit £4232 would earn. Thus, as £23,303 was to £4232, so £2312 16s. 4d. was to the profit that could be earned per annum by the excess works—viz., £420. This amount he deferred for five years, because it would not be realized till then; and the present value of this sum so deferred he calculated at £260. The total maintainable profit, therefore, he brought out as: Maintainable profit on gas manufacture, £2312 16s. 4d.; maintainable profit on fittings account (£79 10s. 8d. multiplied by 5 years and divided by 24 years), £16 11s. 5d; and maintainable profit on excess works and land, £260—a total of £2589 7s. 9d. From this sum, however, they had to deduct £312 for interest on mortgage and debenture bonds, due to be taken over by the District Council, which gave the final figure of £2277 7s. 9d., to which the number of years' purchase was to be applied.

Cross-examined by Mr. Balfour Browne: He preferred to take average figures to making adjustments for coal on the one hand and repairs and renewals on the other. It was possible that, if the adjustments had been actually made, the result would not have been as favourable to the Company as by taking the average system. But there ought to be a production of at least 9800 cubic feet of gas per ton from the north country coal used, instead of the much smaller figure, which was actually the case; and on this basis the adjustment would have been more favourable to the Company. He could certainly increase the make per ton with the present works. Witness went through a calculation, at the suggestion of Counsel, showing that, adjusting his figures for the cost of coal on the basis of the actual figures, there would be a reduction (as against the average figures) of £163. Witness went through a second calculation with a view to showing how an adjustment on the actual figures with regard to repairs and renewals would agree with the sum he had allowed (by taking the average of six years) under this head. On the basis suggested to him by Counsel, with which he did not agree, he brought out a figure which would add £407 to the expenses. A feature of the present case was the large quantity of coal used—that was having regard to the gas produced. He could not account for it. Coal was now a little higher in price than at any time during the past six years; but this did not apply to the whole of the year. All the previous years since 1892 the cost was lower than in the account year. The reason why it was so much higher last year, was because of the small make of gas per ton of coal carbonized. No other part of the works except the purifiers required supplementing.

Re-examined: Judging from his experience, and having regard to the condition of the works, the amount spent on repairs must have been higher than was put in Mr. Lass's table. This was also shown by the fact that the working expenses were higher than they ought to be. It was impossible, when taking over accounts, to be absolutely accurate in apportioning them; the items should be allocated week by week, and even day by day. He was still of opinion that the figure he took more accurately represented the facts than any hypothetical figure put by Counsel, because he (witness), by taking the average of the six years, increased the cost of repairs and decreased the cost of coal.

Mr. *Valon*, in re-examination by Mr. Freeman, with reference to the point which had been made by Mr. Balfour Browne, that the Company had only actually earned 8 per cent., and not 10 per cent. at a particular time, said that the percentage appeared so low because the sum paid in respect of it was applied to £20,500 of capital; whereas at that time the capital was £3500 less.

Mr. *John Morton*, examined by Mr. Freeman, said he was the Manager of the Ashford Gas Company, and had been so for 22 years. In the year ending June, 1897, there was an increase of pressure of the gas of 3-10ths—from 26-10ths to 29-10ths. This increase took place in November, 1896, in consequence of complaints that one district had not sufficient pressure. There was also an increase of consumption taking place, which was an additional reason for putting on the pressure. There was not the slightest ground for saying that this or any pressure was put on to improperly increase the profits. The suggestion to increase the pressure came absolutely from witness, and was made solely to meet the complaints. Last year witness had his salary raised; the rise previous to this having been made five years ago. The increase was made as from July 1, 1896, and was in consequence of a statement to the Directors that he was not being paid according to his results.

Cross-examined by Mr. Balfour Browne: The Company were making less gas per ton now than formerly—a fact at which he was astonished. There was no agreement that witness was to have an increase of salary at stated periods. From the holder into the town, 29-10ths was the maximum pressure he could put on. There had not been complaints from the district, to which he had alluded, before those which led to the extra pressure being put on. He had no official register of the pressures—only scraps of paper, leaves of note-books, &c.

Mr. Balfour Browne: As a fact, has this rise of pressure increased, and largely increased, the consumption of gas?

Witness: No.

Do you really mean to say that 3-10ths increase of pressure did not increase the consumption of gas?—It did not increase the consumption in any appreciable degree.

I suggest that if I have 20 burners in a house with 26-10ths pressure, I shall use more gas when you put on 29-10ths pressure?—Yes; but with 26-10ths pressure on your burners you would have more than sufficient pressure, and with 29-10ths you would be wasteful.

But I should have to pay for it. The increased pressure produces waste, which has to be paid for. I suggest that taking away any number of your consumers, and comparing the amounts consumed for two years, they are higher the year the pressure was greater?—I think not.

Do you usually give notice to the consumers when you put on extra pressure?

Witness said no; adding that the consumption for 1895 was 29,306,000 cubic feet; for 1896, it was 29,813,000 cubic feet; and for 1897, when the pressure was increased, it was 34,382,000 cubic feet. But in that year they had to consider that the penny-in-the-slot meters and cooking-stoves were introduced. Excluding this cause of extra consumption, the increase was a little under 3 million cubic feet.

By the ARBITRATOR: The complaint causing the increased pressure came from a very small district; but the extra pressure was put on over the whole area. The new consumers in 1897, irrespective of those in connection with the prepayment meters, numbered 19.

Mr. *Valon*, recalled and examined by Mr. FREEMAN, said the increase in the pressure would have no effect in raising the profits of the Company; he should regard it merely as a works incident. It would make no difference in the consumption, for the reason that, supposing the consumers' burners had a governor—as nearly all of them had—the increased pressure would not get to the burner, but would be stopped by the regulator.

Mr. BALFOUR BROWNE (in cross-examination): Increase of pressure does lead to increased consumption?

Witness: And so it does to increased leakage.

If you have to put on your maximum pressure, whatever it is, is not that an indication that it is time to enlarge the main?—Not at all. The maximum pressure at Ashford is 30-10ths, which is very light as a maximum pressure; but if you go to 50-10ths or 60-10ths it is a different thing. Here you are well within the limit of your mains; and it is easy to increase the pressure by putting weights on the gasholder. By putting weights on the gasholder, I could put an increase on the pressure without touching the mains.

Mr. FREEMAN said this closed the case for the Company.

The proceedings were adjourned till Wednesday.

Wednesday, July 28.

On the resumption of the proceedings to-day, the case for the Urban District Council was commenced.

Mr. *E. H. Stevenson*, M.Inst.C.E., examined by Mr. BALFOUR BROWNE, said the Company's works were in good condition; the only parts not up to present requirements being the purifiers. The retorts and condensers were more than adequate. He thought the right year to take to ascertain the maintainable profit was the one to June, 1896. He knew of no case in which the twelve months in which the negotiations were proceeding had been taken for account purposes. It was better to take a year when the Company were working without any knowledge that they were to be taken over. Mr. Newbigging had said it was difficult to make adjustments of the figures of any year that might be taken; but, though troublesome, witness had never known a case where adjustment had not been admitted. Mr. Newbigging did, as a matter of fact, make some adjustment, because he allowed £600 for purifiers which he admitted were below the standard. In witness's valuation, he started with the figure of £1907 16s. 3d., the profit shown in the balance-sheet for the year 1896. From this he deducted the interest, amounting to £312, on the mortgage and debenture debts, which the Council were to take over. He then deducted £50, the increase in the Manager's salary, which it had been settled was to be paid as long as the Council employed him. The next item that he deducted was a sum on account of maintenance, renewals, and repairs, which he put at 5½d. per 1000 cubic feet of gas sold. The principle underlying this had always been admitted; but the amount was sometimes disputed. The expenditure on repairs and maintenance of works, mains, and service-pipes had been growing less of late. In the past they had, according to the old accounts of the Company, laid out very large amounts on repairs and maintenance; but a good portion of these sums must have been spent on extensions—at all events, he was convinced that in past years all the sums spent on wear and tear had not been put down under this head, but that some of it had been capitalized. The amount spent on wear and tear in 1893 was 3·70d. per 1000 cubic feet of gas; in 1894, 3·82d.; in 1895, 2·77d.; in 1896, 2·17d.; and in 1897, only 1·92d. None of these figures were sufficient to maintain the hereditament in a condition to command the rent being paid. The earlier figures about sufficed for ordinary repairs, but not for what he called maintenance and renewals. These items ought certainly to be allowed for, because the works were being purchased as if they were absolutely new. Witness took the figure of 5½d. because, though 5d., as a general rule, was admitted throughout the Midlands and the North, the corresponding figure in the case of the Suburban Companies was 5⅔d. Taking the average of the past three years, the figures for the London Companies was 4·78d.; the Suburban Companies, 5·75d.; the Corporations, 4·81d.; and the Provincial Companies, 4·44d. The average in the case of the Corporations was so low because not any of them were in a really bad position as to coal, &c. Applying this figure of 5½d. to 34,498,000 cubic feet, the make of gas, gave £478 13s. 2d. as the sum which a prudent tenant and landlord—the tenant for ordinary repairs, and the landlord for renewals—would have to expend, in addition to the sum which the Company had allowed. Deducting the three items of £312, £50, and £478 13s. 2d. from the £1907 16s. 3d., gave £1067 3s. 1d. The profit on fittings he had dealt with as Mr. Valon had, except that he (witness) only allowed three instead of five years' purchase. The sale of these fittings was carried on, not like the gas-works, as a monopoly, but in a town where they were subject to competition; and they should therefore be subject to the rule regarding ordinary trade profits. In this way he allocated £5 11s. 2d. under this head, still taking the figures for 1896, in place of the £16 allowed by Mr. Valon. This was a sum which was a proper addition to the maintainable profits; and so adding it, they got his final figure, representing the maintainable profit as £1072 14s. 3d. As showing that in the case of the Ashford works enough had not been spent on maintenance, &c., he mentioned that in Field's "Analysis" the working expenses in the Suburban Companies came to 17·09d. per 1000 cubic feet, against 13·11d. in the present case; and the disparity was increased by the fact that the first figure was exclusive of expenditure on public lamps, whereas in the latter this item was included. That was a further reason for saying 5½d. was an accurate figure. In his valuation, there was no reference to surplus works; the reason being that he had considered them when agreeing to give as much as 24 years' purchase of the maintainable profits. The purifiers were too small, but they would not require further capital expenditure for a few years; and he thought the Council ought to give a somewhat higher number of years' purchase than was usual because the profit was better secured by the surplus works than it would be if the works were only just equal to supplying the consumption. If there had been no surplus works, he should not have agreed to so many years' purchase. Mr. Valon had put the coal-bays down as holding 1500 tons; but witness found that, if filled to the level of the railway rails, they would only hold 900 tons, which was not too much storage for such works. All the retorts except two beds had been used, and these retorts he always reckoned as necessary; and, further they were not constructed on the best principle. He agreed that the condenser was 25 per cent. too large. Works should always be in the position of having a little capacity over and above what was sufficient for their maximum make. This spare capacity should be about 20 per cent. in the case of the retorts, but not so much in the other plant. As to increasing the pressure on the gas by 3-10ths to its maximum, he should certainly say the consumption had been increased thereby. It was curious that in the last year of occupation—when the Company knew they were bound to sell—the consumption should grow so suddenly. The increase shown in 1897 could not, he thought, be maintained. Even 26-10ths pressure was very large for a place like Ashford.

The ARBITRATOR, on the conclusion of the witness's examination-in-chief, said he was not satisfied that they ought not to take the 1897 figures. His first impression was that this was what the Act contemplated. On the other hand, he fully acknowledged that Mr. Balfour Browne might have objections to that year, which, of course, might be good or bad. Assuming them to be good, the last year could be cut down by any objections Mr. Balfour Browne might have whether to the increase or otherwise. The section of the Act mentioned no particular date; presumably therefore the maintainable profits were to be the profits as far as ascertainable at the time the price was fixed.

Mr. BALFOUR BROWNE said he would address himself to the point in his speech.

Witness, in cross-examination by Mr. FREEMAN, said the accounts for 1897 showed a large and startling increase in receipts, and a saving in working expenses. The actual increase in the consumption of gas for private lighting over 1896 was roundly 4½ million cubic feet, which included the gas supplied to 205 gas-stoves fixed in the latter part of 1896 and the early months of 1897. He could not say whether the average consumption of a gas-stove was about 25 cubic feet a day. There was a large increase of consumption through prepayment customers, which he would take at 1,809,000 cubic feet. This quantity, with the amount used by the gas-stoves, supposing the latter consumed 25 cubic feet each per day, would make a quantity which, if subtracted from the total increase of 4,569,000 cubic feet, would leave a normal increase of about 889,000 cubic feet, or 2·58 per cent., which was near the average increase of the last five years. There had of late years been considerable increase in the use of gas by means of gas-stoves and prepayment meters—particularly the latter. If they excluded the 1897 figures in calculating the maintainable profit, he agreed they would exclude some, but not the whole, of the benefit the Company derived from the stoves and prepayment meters. This matter of the stoves and meters was another consideration leading him to allow so many as 24 years' purchase. Taking the accounts for 1896 instead of those for 1897, would make a difference in favour of the 1897 accounts in the maintainable profits, according to his valuation, of about £260. The Company had been largely spending out of revenue on capital account—pulling down works, putting up new ones, reorganizing, &c.—and all this, or a large portion of it, had been capitalized. It appeared in Mr. Lass's account, not as wear and tear, but as capital; or, in the Company's own accounts, as extensions. The works could not have been kept in their present condition over a series of years at an expenditure, as appeared from Mr. Lass's account, of 2·17d. per 1000 cubic feet. Practically speaking, enough had been spent on the ordinary repairs, but not upon renewals. Considering the way the accounts were kept, it was quite possible that, in past years, more had been spent, not out of capital but out of revenue, than appeared to be the case. But it was not possible as regarded 1896 and 1897, because when Mr. Lass got out the accounts everything in regard to those years was fresh in the minds of the Manager and all parties at the works. Witness admitted that, in a number of cases that were put to him, the repairs might have cost much less than the figure he had given in the Ashford case; but he held that an average must be taken, and not individual cases. As to the make of gas per ton, the Company ought to get from the coal they were using at least 10,000 cubic feet. He was not at all sure they were not obtaining it, for when he went over the works he noticed that the water-line of the station meter was between ¼ and ½ inch too low, and he was certain that at this period they were making more gas than it registered. This would point to a leak in the town; and that idea was confirmed by the smell which arose when the soil was opened. If there was a loss of 1000 cubic feet per ton, he should not say the accounts would have to be rectified to the extent in favour of the Company. If the loss arose through fraud, it should be rectified; but not when it occurred through ignorance on the part of employees. If the surplus works were not considered when the number of years' purchase was put at 24, they ought to be considered now. In taking into account the surplus retorts, he held that supposing the total retorts were capable of producing 400,000 cubic feet, 20 per cent. should be deducted as a stand-by or safeguard in case of some breakdown; then taking from the residue the 208,000 cubic feet actually used at the present time, gave the surplus. Applying the purchase price, according to his calculations, to the gas sold gave a figure of about £980 per million cubic feet.

Re-examined by Mr. BALFOUR BROWNE: This latter figure of £980

seemed large, because he could construct gas-works at the rate of £500 per million cubic feet all told. The storage capacity for coal would only cover four weeks' make, which we generally considered insufficient. In rating cases 4½ to 5 months' supply was always allowed. He was convinced the leakage was greater than was said to be the case, because the ground was so saturated with gas. From 1892 to 1897, in no one year had an adequate sum been attributed to working expenses. They had spent money on this head out of revenue, and then capitalized it, which came to pretty much the same thing as issuing new capital.

Mr. *W. G. Hancock*, Chairman of the Ashford District Council, gave evidence as to the use of a gas-stove by his firm in 1865, and, he believed, ever since; and as to complaints having been made of the gas in South Ashford, not only since 1897, as stated by Mr. Morton, but for the last ten years.

Certain sheets which Mr. Morton had been asked to produce were now handed in.

Mr. Balfour Browne (after examining them) said they related to pressures of mains about the town, and were of little use.

Mr. *W. R. Chester*, M.Inst.C.E., examined by Mr. Balfour Browne, gave evidence in confirmation of that of Mr. Stevenson. During the five years ending June, 1896, the net profits had been: 1892, £1747, or 1s. 2·29d. per 1000 cubic feet sold; 1893, £1932, or 1s. 2·94d; 1894, £2506, or 1s. 6·48d. (this being an abnormal year, the profit being due to the fact that it was the year following the great coal strike, and that they paid about £300 less for coal and received about £300 more on other heads); 1895, £2147, or 1s. 3·19d.; and 1896, £1907, or 1s. 1·27d. For 1897, though the total profit was higher, that per 1000 cubic feet sold was about the same. The cost of coal since 1894 had risen from 5·59d. per 1000 cubic feet to 10·48d. in 1896, and 11·46d. in 1897. Coal was rising and residuals were falling, and were likely to continue to do so for some time. Since 1892, the Company had reduced the price by 2d. per 1000 cubic feet in 1894, and 1d. in 1896. The receipts had, however, increased, so that these reductions had not affected the profits. Witness's calculation as to the maintainable profits was the same practically as Mr. Stevenson's, save that he did not deduct the increase of £50 in the Manager's salary. He thought there might be some increase in the sale of gas that ought to be taken into account; and he therefore set this against the £50. He also agreed with Mr. Stevenson that the surplus works were part of the consideration for giving the 24 years' purchase.

Cross-examined by Mr. Freeman: He should think 25 cubic feet each per day a fair allowance for the consumption of gas-stoves; and on this basis, and taking it, as they knew to be the fact, that the prepayment consumers used 1,800,000 cubic feet, the increase of 1897 over 1896 would be 2·57 per cent., which was not an unusual increase for the Company. The figure of 5½d. per 1000 cubic feet for repairs and renewals was not rather high; 4½d. was often taken, but not with small works such as these.

Mr. Balfour Browne then addressed the Arbitrator on behalf of the Council. Dealing first with the bargain which was made between that body and the Company in March last, which formed the basis of the present proceedings, he held that it was necessary, in interpreting it, to ascertain what was in the minds of the two parties as to which year was to be taken as the account year. Neither could have known what the accounts to June 30, 1897, would work out to; and both must have had in their minds the condition of the works and the figures as for the year 1896. He therefore asked the Arbitrator to interpret the words "maintainable profits," as regarded by the parties at the time they made the bargain, as meaning the profits shown to be maintainable by what had been settled and done, and what was then ascertained. "Maintainable" meant the maintenance of something that existed. If it had been intended to allow the prospective value or the profits as in the year to June, 1897, words to this effect would surely have been inserted. The bargain became binding on the parties when the Bill received the Royal Assent on June 3, if not in March when it passed the Committee, and if the Council had chosen they could then have agreed as to the maintainable profit. Could it be held that the Company could, in that event, have said they would wait till June 30, in order to see what the profits for the year were? On that reasoning, they could just as well ask the Council to wait till June 30, 1898. He did not say they should wholly disregard the 1897 figures, because they were valuable in connection with the question of security as to whether the profits were or were not maintainable. One strong reason for not taking the 1897 figures was that, if they did, adjustments would have to be made, which would be subject, of course, to severe criticism. Another strong reason was that during 1897 the Company knew there was a proposal to purchase their undertaking; and, without making suggestions, he remarked on the fact that no reliable records were forthcoming as to the pressure, by increasing which the consumption could be sent up. The reason they wanted to take the 1897 figures, he ventured to say, was that there was in that year a very large augmentation in the quantity of gas used—about 13 per cent., as compared with 1·68 per cent. in the previous year. Even having regard to the penny-in-the-slot meters and the stoves, he asserted that they had largely increased the consumption of gas by the inordinate pressure they had put on. The only way to get at the maintainable profit was to take a year when they were working as if they did not know they were going to be purchased.

The Arbitrator said there was no doubt the bargain was complete in March last. This being the case, it might be that the profits ought to be taken as at March.

Mr. Balfour Browne said that might be so; but as the accounts were not made up weekly or monthly, but yearly, he thought a year's accounts would have to be taken. If he were right in his contention, the figure for the profits of 1896 would be £1907. What was to be set against that figure? Mr. Newbigging said an adjustment was necessary—that they should reduce the price of coal and increase the figure of maintenance and repairs. Mr. Newbigging had done this in every other case with which he had had to do; and why he did not do it now Counsel did not know. Mr. Valon did make an adjustment, but did it wrongly. Against the receipts of a particular year, he placed the expenses of an average of six years. That was obviously unfair; for how could anyone value works on an average of expenses when they found coal cost a little more than 5d. per 1000 cubic feet in 1894 and 11d. in 1896? Mr. Newbigging's method was, as to principle, right, though he and Counsel disagreed as to figures. Mr. Newbigging commenced his calculations by assuming that the coal produced 1000 cubic feet per ton more than it did; and, adjusting the coal item on this basis, he arrived at a figure of £163 which was to be added to the profit. Adjusting the working expenses in the same way, Mr. Newbigging produced a sum of £407, which Counsel asserted had to be added, without deduction, to the working expenses; for, on account of the fallacy as to the 1000 cubic feet of gas, he declined to set the £163 against the £407. This £407 was practically all there was between them on this point. With regard to the profit on fittings, he held that three years' purchase with a liberal allowance, having regard to the fact that this portion of the business was not a monopoly, and that the ordinary number of years' purchase of business profits was three. As to the claim in respect of surplus works, he argued that it could not be allowed. Surplus works had to do, not with maintainable, but with future profits—nothing else—and future profits they were precluded from considering. The only way in which these works could be considered was as to securing the present profits; and they had been so considered when the 24 years' purchase was agreed upon. In conclusion, he summed up by asking the Arbitrator to come to the conclusion that the year 1896 was the right one to take; that there ought to be a deduction of the Manager's salary and of the extra repairs; that the profits on fittings, being an ordinary trade, should only be multiplied by three; and that the surplus works were not to be taken into consideration at all, because they meant future profits and not profits in hand, and the words "maintainable profits" must mean profits that had been, and not profits that were to be, realized.

The Arbitrator, on the question of surplus works, asked whether supposing the surplus works of the Company were of such extent that, apart altogether from the question of security, they ought to be taken into account, Counsel would hold that under the Act of Parliament he was precluded from doing so.

Mr. Balfour Browne said that he should. If when the bargain was made the Company had in their mind surplus works beyond maintainable profits, they should have inserted a clause to that effect. If there were no clause that the Council were to purchase the stores, he should have claimed that the Council were entitled to the whole of them without further payment, as he now claimed for the surplus works.

Mr. Freeman, in replying on behalf of the Company, took Mr. Balfour Browne on his own contention—that under the agreement they were to take the maintainable profits as the profits which had been actually earned; and he pointed out that at March last, when the bargain was made, very nearly three-fourths of the whole profit for 1897 had been earned, and by a slight calculation they could have ascertained what the profits would be for the year. Everybody in Ashford knew what was going on—that the business was increasing, and that they were developing a new phase of the business during the year. It was impossible to take the figures then, because the practice having been to make them up to June 30, they could not be made up to March 10. It was evident, therefore, that everybody considered the transaction should be taken as from June 30, 1897. Thus it was arranged that until that date the Company, for their own profit, should carry on the business; and that after that they were to carry it on, until the actual transfer, merely as trustees of the Council. If it had been suggested that the Company were to be bound down to a year which was not so good as the one when the Bill was before Parliament, they would obviously have asked a larger number of years' purchase. Supposing the 1896 figures were taken, although the Company had carried on business in a proper way, had expended money without a suggestion that it was not a proper thing to do, and had been erecting meters and stoves in the ordinary course of developing their business, they would not get a penny in respect of those things. It was contrary to common sense and to fairness that they should not get the entire benefit of their works. Mr. Balfour Browne said they could not take the year 1897, because there were suspicious circumstances in connection with the large increase that occurred then. But if they took from the total increase of 4,569,100 cubic feet 1,809,400 cubic feet as belonging to the prepayment meters (which was the figure in the accounts) and 1,870,000 cubic feet as the consumption of the gas-stoves (on Mr. Chester's basis of 25 cubic feet each stove per day), they only had 889,075 cubic feet as the ordinary increase, which was just about the normal. This he thought effectually disposed of the suggestion that the increase was not legitimate. As to the allowance that was to be made on account of repairs, renewals, &c., they started with the important admission that the works were at the present time in perfectly good condition—so much so, in fact, that both Mr. Stevenson and Mr. Chester said a good deal more had been spent on them than the 2·17d. per 1000 cubic feet appearing in Mr. Lass's accounts, and they put the figure at 5½d. If the Company's accounts showed that they were only charging 2·17d., he (Counsel) would have admitted that an adjustment should take place. But the Company's accounts were not kept as Mr. Lass had now arranged them; and Counsel asserted that, in respect of the items which had in the Company's accounts been grouped together, but which Mr. Lass had now split up, there had probably been a misarrangement of some—more being put under certain heads in the account than was expended under those heads, and less charged to wear and tear than was actually so expended. Therefore, in accepting Mr. Valon's and Mr. Newbigging's figure of 4½d. as a reasonable charge, he asserted that this 4½d. had been expended and appeared in the accounts. In other words, that in the figure covering the management of the property there had been included a proper sum for wear and tear, though it did not appear under its right head. There was not a scrap of evidence to show that any of the expenditure on repairs had been treated as capital, as Mr. Stevenson had suggested. Mr. Balfour Browne contended that the Arbitrator was absolutely precluded from considering the surplus works, and asserted further that they were taken into consideration in the number of years' purchase. There was not a jot of evidence to show this. Surely, in ascertaining the maintainable profit, they should look to see whether the Company were progressing or receding—what their present, past, and future condition was or would be. If it was found that they had expended money on buildings not in use at the present time, but which could be utilized in the future at little or no further expenditure, certainly the profit on those buildings ought to be considered as an element in regard to the maintainable profit. In conclusion, Counsel pointed out that, on the figures advanced by the Council, the maintainable profit was put at only £1072, on which basis the purchase price worked out at £980 per million

cubic feet of gas made—a figure so low that the other side had only been able to suggest one solitary case which was anywhere near it.

The Arbitrator reserved his award; and, after consulting with Counsel, stated that, as it was not considered necessary, he should not visit the works.

The proceedings then terminated.

BIRMINGHAM CORPORATION GAS SUPPLY.

Mr. Hack's Salary—Wages of the Men—The Application of the Profits.

At the Meeting of the Birmingham City Council last Tuesday, the above questions (a report in regard to the first two of which appeared in the "Journal" issued that day) were introduced for consideration.

Alderman Pollack, in moving the adoption of the Gas Committee's recommendation that the salary of Mr. Henry Hack, the Engineer of the Saltley Gas-Works, be increased from £1050 to £1200, said he trusted that the reasons given in the report would be sufficient to convince the Council that the recommendation was based on justice, on merit, and on the honourable fulfilment of the pledges given by the Gas Committee to Mr. Hack. He had been Managing Engineer of the Saltley and Swan Village Gas-Works for the last twenty-four years, and had devoted during this time in a most successful manner his best energies and his undoubtedly great talents to the duties which were entrusted to him. Since he first entered their service, the gas consumption had vastly increased, and the methods of manufacture had been completely changed. The productive power of the works had been nearly doubled; while the introduction of eight-hour shifts had necessitated larger employment and management of workmen. The cost of manufacture must have been very considerably reduced, or else it would have been impossible to reconstruct, modernize, and double the capacity of the works with hardly any addition to the capital expenditure, or to accumulate a reserve fund of nearly £600,000, or to make contributions to the rates. Mr. Hack's remuneration had not kept pace with his merits. While his works were among the most economically managed in the kingdom, and while he had made improvements of the value of more than a quarter of a million pounds, and was still engaged on others, his salary had been practically at a standstill since 1882. At that time he received £950; and in 1889 £100 was added, though Mr. Hack had to give up certain emoluments which really reduced the increase to about £40. An increase of £100 during fifteen years of the best and hardest work was certainly not extravagant. The salary, if raised, might appear to be a large one; but even then it would be considerably less than was paid to engineers who occupied similar positions in London and the provinces. Finally, he said the salaries of the two Engineers should be of equal amount. Their work was of equal magnitude, and their responsibilities were the same. Why, therefore, should not the pay be so?

Mr. Stevens, in seconding the motion, said that it might appear strange that he adopted such a course after the action he took two years ago. On that occasion, when he voted against the increase, there were special reasons which no longer existed; and he had come to the conclusion that the increase to Mr. Hack was merely an act of justice. The duties of Mr. Hack and his responsibilities were equal to those of Mr. Hunt, and were therefore deserving of the same recognition.

Alderman Kenrick, M.P., a former Chairman of the Gas Committee, supported the proposition. He was of opinion that Mr. Hack had not been justly dealt by for some time, and could bear testimony to the able, faithful, and valuable services he had rendered the Corporation.

Mr. Jarvis said he recognized the excellent personal qualifications of Mr. Hack. When, however, he found the Corporation were paying, not one, but two salaries amounting to £2250 a year for the head control of their gas-works, he thought their payments were far in excess of those of other large gas-works.

Mr. Beale said that, probably through unfamiliarity with his subject, Mr. Jarvis had made one or two misleading statements. He spoke of two departments. It was true they had two Engineers; but they had four gas-works. The Corporation took over two undertakings with an Engineer to each. He thought it quite possible one of their Engineers might resign; and they would then consider whether they should perpetuate the present system, or have only one Engineer. He was perfectly sure they would pay quite as much in salaries if they only had one man, because he could do nothing more than supervise, and would have to have competent well-paid engineers under him. Their present Engineers undertook constructional work, which was not done by the engineers of other works. They had built their works by their own Engineers; and they had not given Mr. Hack sixpence for his part of the work.

Mr. Dexter said he would vote for the resolution if he had an assurance that the nuisance arising from the water-gas plant at Saltley would be stopped.

Alderman Pollack replied that every precaution would be taken to do away with the trouble complained of.

The resolution was passed by 40 votes to 13.

Alderman Pollack, in moving that the Gas Committee's report be approved, said that contracts for the purchase of coal had been made at an advance which represented in the aggregate £2200. The price, too, which they would obtain for tar would be less than last year; and there would be a reduced income from residuals. On the other hand, the consumption of gas had increased during the last quarter by 17¼ per cent.—the highest on record. Important concessions had been made to the gas workers at the four works. In December, 1894, he explained that the change from twelve-hour to eight-hour shifts entailed an increased annual expenditure in wages of £34,000—principally for the additional labour required. The Committee, therefore, were surprised at the beginning of February to receive a memorial from the men requiring extensive alterations in the hours of working, and increases of wages in several departments. After careful calculation, it was found that the demands involved an annual expenditure of £18,000. The Committee at once grappled with the question, and had interviews with deputations representing the men from the works. He thought the result of those interviews was that it was made apparent to the men that they were under some misapprehension, and that many of the demands they made were not justified. After fully going into the question, alterations were made respecting Sunday work and increases of wages, which, on the present output, would represent an annual expenditure of £9000, which, added to the former concessions, was a large sum. The Committee, however, felt they were serving the best interests of the Corporation by dealing with the men in their employ in a spirit of absolute fairness and sympathy.

Mr. Jephcott thanked the Committee for the spirit in which they had dealt with the workmen in their employ.

The motion was adopted.

At a later stage of the proceedings,

Mr. Lane moved—"That this Council, having observed from the printed estimates of 1897-1898 that neither the £10,250 surplus profits of the Gas Department for the year 1896-1897, nor the £5000 estimated additional profit of the same department (over and above the £29,000 appearing in the estimates) for the year 1897-1898 have been applied, or can now be applied, in aid of the improvement rate for 1897-1898, although allocated by this Council for that purpose, hereby expresses its opinion that the information placed before it on March 2 last (when the rate was formulated) was eminently inaccurate. This Council, therefore, directs that the £15,250 available, but not utilized for the purpose of the current estimates, together with the sum of £4892, being the amount of the improvement rate now levied in excess of requirements, collectively £20,132, shall be preserved intact, and be brought, together with interest, to the credit of the improvement rate for the financial year of 1898-1899."

Mr. Randall seconded the motion.

Alderman Clayton, Chairman of the Finance Committee, said that the answers to Mr. Lane's allegations came under four heads. First, with regard to the £10,250, the so-called surplus profits of the Gas Department for 1896-7, those profits had already been applied in aid of the improvement rate of 1897-8; the money having been paid on June 16 last. As to the £5000 estimated additional profit over and above the £29,000, this had been intentionally left out of the final estimates, as it was found, when they were made up, that there was a surplus instead of a deficiency, as estimated in March last. The estimates in March last, before the books were made up, were within 5 per cent. of the facts as ascertained in June; and therefore in no sense could they be said to be "eminently inaccurate." With regard to the expression "estimated additional profit," no such word as profit occurred either in the report of the Gas Committee or in the Act of Parliament; the words in the former being "sums available from the funds of the department in aid of the improvement rate," and in the latter "net surplus." The Council, therefore, could not direct that the £15,250 should be brought to the credit of the improvement rate, inasmuch as £10,250 had already been paid over; and the other £5000 had not yet been made. The same remark applied with regard to the £4892, being the amount of the improvement rate levied in excess of the estimated requirements. Until the books were made up to March 31 next, that sum was necessarily an estimate only; and if the Committee went on spending as fast as they had done that afternoon, there would certainly be a deficiency instead of a surplus.

Mr. Lane replied that he could not find any trace of the £10,250 in the final estimates for the current year.

The resolution was lost.

ELECTRIC LIGHTING NOTES.

Mr. R. H. Bicknell, an Inspector of the Local Government Board, has held an inquiry at Worcester relative to an application by the City Council for sanction to borrow £8834 for electric lighting extensions. The principal witness was the Electrical Engineer (Mr. R. Murray), who stated that the demand for electricity last year increased by 50 per cent. They were able practically to meet that by running the whole of the plant, and leaving no reserve. At present they had a capacity for supplying 15,000 lamps, and were desirous of bringing the total up to rather more than 23,000—the number of lamps which they had already connected. Explaining the need of a new 100-horse power engine that was stated to be required, Mr. Murray said they had some of their machinery driven by water. But they had never had sufficient water power to get the full benefit from that part of the plant; and the engine would assist the turbine. The Finance Clerk (Mr. F. George) mentioned that the amount borrowed for electric lighting was £59,877; and £3295 had been paid into the loans fund.

The subject of the electric lighting of the Thames Embankment and Westminster and Waterloo Bridges was again under discussion at the meeting of the London County Council on Tuesday. The Highways Committee presented a report on the matter, furnishing the additional information required by the Council, and asking for power to invite tenders by public advertisement for the erection of the generating station, and for the supply of necessary machinery, mains, lamp-standards, and other plant for the installation. Lord Mountmorres asked if, under the new scheme of lighting, the row of small gas-lamps on the wall of the Embankment, which he thought made one of the prettiest sights in London at night, would still be lit. He said if this were not intended, he should oppose the adoption of the report. Earl Russell, the Chairman of the Committee, said he believed the lamps would be retained; but he could not be certain. Lord Mountmorres then moved, and Mr. R. Spokes seconded, that the report should be referred back to the Committee for definite information on the subject. Mr. Fletcher pointed out that the gas lighting on the Embankment was destroying the trees. Mr. Dickinson thought the Council should not hurry this matter. If the present scheme were carried out, he felt certain the Council would regret it. The amendment to refer the report back was ultimately carried by a large majority.

Some uneasiness is manifesting itself at Plymouth respecting the proposal of the Corporation to combine a system of electric traction for the tramways with the electric lighting undertaking which is now being constructed. The Corporation own and work certain of the tramways; and they have hitherto carried them on at a loss. There is an idea that the substitution of electric for horse traction is going to convert the loss into a profit; and it is proposed to try it on one of the sections as a beginning. So far as the estimate goes, the prospect is not very encouraging; the idea, as with the public lighting, being, as it seems, rather to make an apparent profit for the electric undertaking than to benefit the other departments. The objection is, however, rather to the unsightliness and danger of the overhead system than to the

financial aspects of the scheme. A number of people have been impressed with the idea that what is not good enough for Birmingham will not be found satisfactory in Plymouth, where the streets are narrow. Great expense is being incurred in widening some of the main thoroughfares, and the idea of creating new means of obstruction by poles and brackets and wires is looked upon with much disfavour by some of the ratepayers. In order to form a definite idea upon the subject, the Mercantile Association appointed a Committee to make special inquiries into the working of the overhead system in other towns. The Committee visited Bristol, Walsall, Birmingham, and Wednesbury, and studied the reports presented to the Corporations of other towns on the subject. As the result, a majority came to the conclusion that the danger and unsightliness of the system are not so great as they had imagined, and that it is the very plan which can be worked with the hope of financial success. The Chairman of the Association, on the other hand, reported against it, and said that the feeling everywhere that the deputation visited was that the trolley system was only tentative, and must before long give way to something less objectionable. "Electric traction and electric lighting too, in its present incomplete condition, is," he went on to say, "a costly toy, even for corporations; and can be waited for until beyond the experimental stage by corporations such as ours, who have no money to experiment with, and whose financial resources are all too limited for such purposes." A special meeting of the Association was held to consider the subject, and the result of a long discussion was that most of the members present endorsed the views of the majority of the deputation. The result of the controversy has, however, been to increase rather than allay the feeling of distrust in the wisdom of the course the Corporation are pursuing.

THE LONDON COUNTY COUNCIL AND THE WATER QUESTION.

The Council and the Water Commission.

At the Meeting of the London County Council last Tuesday—Dr. W. J. Collins in the chair—the recommendations of the Water Committee with regard to the evidence to be given on behalf of the Council before the Water Commission were again under consideration. It may be remembered that, at the previous meeting (*ante*, p. 232), the first recommendation—"That, in the opinion of the Council, the water supply of the Metropolis should not continue wholly in the hands of private Companies, but should be under effective public control"—was agreed to. The second recommendation was then submitted, as follows: "That, in the opinion of the Council, the undertakings of the Metropolitan Water Companies should forthwith be purchased at the fair and reasonable value of the same; regard being had to the rights, special circumstances, and obligations of the Companies." To this Mr. Porter had moved the following amendment: "That, since the purchase of the undertakings of the Metropolitan Water Companies would probably increase the cost of water to the public, the Council should not pronounce an opinion in favour of such purchase pending inquiry by the Royal Commission." The amendment was under discussion when the Council adjourned. On the resumption of the debate, a division was taken, when Mr. Porter's proposition was rejected by 53 votes to 37, and the Committee's recommendation adopted.

The Committee also recommended—"That the management of the water supply should be effected either (1) by the London County Council supplying its own area directly, and outside authorities in bulk at a fixed price; or (2) by the London County Council supplying its own area only, and the outside authorities supplying their areas; or (3) by a new body supplying directly the whole area both within and without the county." Mr. G. J. Cooper moved that all the words after the word "areas" be omitted. He said he understood the Council were opposed to anything like a Water Trust; and he could not help thinking that the Committee had made the recommendation to "smooth over" some of the members of the Moderate party. In his opinion, the Council ought to state definitely to the Commission what body should have control of the water. Mr. N. W. Hubbard seconded the amendment. The Earl of Onslow said he would not enter into the merits or demerits of the recommendation. He simply wished to remark that the Council ought to get on to the important business on the *agenda*, and, in the name of the Moderate party, to protest against the Committee's proposal. Mr. M'Kinnon Wood hoped the Progressive party would vote for the amendment. He said it would be a ridiculous position if the Council were to state that any good result could come from electing a new body to control the water supply. Mr. Dickinson said the recommendation was brought forward as an attempt to get a unanimous decision of the Council on the water question. The other recommendations were drawn up for the same purpose. He should vote for the amendment. On a show of hands, 39 votes were given for the amendment, and 33 against it. A division was called for; but the Moderates failed to appoint tellers, and the amendment was carried.

The following recommendation of the Committee was adopted without discussion: "That, in any case, as the County of London contains 87 per cent. of the rateable value, and over 79 per cent. of the population, of the whole area supplied by the Metropolitan Water Companies, and will thus be liable for more than four-fifths of the purchase-money, it is desirable that the London County Council should, in the first instance, be the purchasing authority on behalf of the population of the whole area concerned."

The Committee also recommended: "That, if the undertakings of the Water Companies are not acquired, it is essential that effective powers of control should be given to the County Council, and, further, that the position of the Companies should be reconsidered and the law amended, particularly as regards their power to make and recover rates and charges and divide profits, and their obligations respecting the supply of water." To this Lieut.-Col. Ford moved the following amendment: "That all words after the word 'That,' in line 1, be omitted, and that the following be inserted: 'whether the undertakings of the Water Companies are ultimately acquired or not, it is urgently necessary, even as a measure of temporary relief to the inhabitants of the County of London, that more effective powers of control should be given to the County Council, and, further, that the position of the Companies should be reconsidered and the law amended, particularly as regards their power to make and recover rates and charges and divide profits, their obligations respecting the supply of water, and their non-liability to an interchange of supply in cases of emergency.'" Mr. Steadman seconded the amendment. Mr. Dickinson said he could not accept the amendment, as it did not deal with the point in question. The recommendation of the Committee was framed in the exact words of the reference to the Commission. The amendment was lost, and the recommendation agreed to.

NEW WATER SUPPLY FOR EASTBOURNE.

Our readers may remember that, among the Bills which have been before Parliamentary Committees this session, were two relating to the provision of an additional supply of water to Eastbourne—one being promoted by the Corporation of that town, and the other by the Water Company. In the result, the Bill of the former was rejected, and that of the latter passed—subject, however, to the Company giving an undertaking that the new supply should be brought into Eastbourne by the 1st of August. Sir F. Bramwell, F.R.S., who was consulted upon the matter, reported that it would be possible for the Company to carry out their undertaking; and the works were at once commenced. A contract was entered into with Messrs. John Aird and Sons; and the works have been completed under the superintendence of Mr. F. Stileman, M.Inst.C.E., the Company's Engineer. The formal opening will take place next Friday, when the Mayor and members of the Corporation will be present in state, and the Duke of Devonshire will turn on the new supply. This is obtained from a well at Friston which had already been partially sunk in the chalk. The present yield of this well is about 1 million gallons per day; but by sinking it deeper, and by driving galleries, the yield can be increased to 2 or even 3 million gallons. The machinery at Friston consists of two pairs of engines and pumps. One is a compound condensing Worthington pump, which is fixed about 100 feet down the well, and delivers the water into a tank at the surface. The other is a triple-cylinder condensing Worthington pumping-engine, capable of delivering 1 million gallons in 24 hours against a head of 500 feet of water. This engine is at the surface, and it pumps the water from the tank to Eastbourne through a 21-inch main. This is 4 miles in length, and is laid over Friston and Beachy Head hills. Arrived at Eastbourne, the water is delivered into two reservoirs at Mead's Hill, whence it is distributed to the town by gravitation. The carrying out of the contract by Messrs. Aird and Sons constitutes a very smart piece of work. The pumping-engines have been fixed and tested, and the mains laid, a week within the contract time. It is gratifying to learn that, though the Bill of the Corporation was thrown out, the authorities have from first to last rendered the Water Company every assistance in carrying out their scheme.

THE DAVENTRY TOWN COUNCIL AND THE WATER SUPPLY.

For some time the authorities at Daventry have been seriously concerned regarding the water supply, which, it is said, is not nearly sufficient for the whole town. Efforts were made to purchase the existing Water Company's undertaking; but as terms could not be agreed upon, the Council decided to go in for a scheme of their own. As a consequence, plans and estimates prepared by Mr. J. Eunson, of Northampton, were sent to the Local Government Board, together with an application for a loan of £6000 to carry out the proposed works. As the result of that application, Colonel A. J. Hepper, one of the Local Government Board Inspectors, recently held an inquiry at Daventry. The case for the Council was stated by the Town Clerk (Mr. F. Willoughby), who said the present Medical Officer of Health and also his predecessors had recommended the Council in their annual reports to increase the supply of drinking water; and the Local Government Board had also asked two or three times what steps the Council were taking to comply with that recommendation. They had had several reports from engineers, and finally instructed Mr. Eunson to prepare a scheme for giving the town a proper supply of water. This was the scheme which was submitted to the Local Government Board, and for which the Council had asked permission to raise a loan of £6000. At the present time, the town was principally supplied by a private company, which served about half the rateable value; and the remainder of the town was supplied by pumps, public and private, most of the wells being 60 or 70 feet deep. Negotiations were opened with the present Water Company for the purchase of their undertaking; but the affair fell through. The Company's water was good, but intermittent. In answer to the Inspector, Alderman Willoughby stated that the Company would be prepared to supply the town; but they would want a security, as their capital would have to be increased. The Inspector remarked that there seemed to be a general opinion that at the present time there was a general deficiency as regarded water supply; and those present agreed. Mr. Orams said the Water Company could not supply one-eighth of the town properly; and the Mayor (Alderman Thornton) said he saw no reason why the two systems should not exist side by side. Dr. Foster contended that water could be got by the Company much more cheaply than by the present scheme; and Alderman Willoughby objected to paying such a large sum of money for what could be done for much less. Dr. Oldacres, the Medical Officer of Health, gave evidence as to a deficiency in the water supply, and said he was not prepared to guarantee that the water in the public wells was pure and uncontaminated. After other evidence, Mr. Eunson explained the scheme. Water, he said, was found in a bed of sand some distance from the town; and it was proposed by means of oil-engines to pump it into a water-tower, which was to be built on high ground, and from thence supply the town by gravitation. The cost was put down at between £5000 and £6000; but witness thought, when everything had been paid, they would require quite the latter sum. The water was quite pure; there was no possibility of contamination; and there seemed an ample supply. It could be pumped into the tank at a cost of 4½d. per 1000 gallons, and into the town at a cost of 1s. per 1000 gallons, including every possible expense. At the close of the evidence, the Inspector visited the site of the proposed works.

NOTES FROM SCOTLAND.

From Our Own Correspondent.

Saturday.

The North British Association of Gas Managers held their annual meeting—in accordance with the custom of alternating what is euphemistically known as a country town between the meetings which are held in Edinburgh and Glasgow—in Ayr this week. On account of the "JOURNAL" going earlier to press this week, by reason of the Bank Holiday, I have not time to say much on the subject of the meeting, but may return to it. I will only remark that in point of numbers it was most successful; in point of interest, it was much better than the titles of the papers which were read would have justified; and in point of attraction—in the matter of sight-seeing—it was unsurpassed by any previous meeting of the Association.

The Edinburgh and Leith Gas Commissioners got through a long programme on Monday. It is satisfactory to note that the consumption of gas still increases. For the month of June, it was 4,766,000 cubic feet more than in the corresponding period of last year; and from May 15 to the end of June, the increase has been 7,844,000 cubic feet. This was considered by Bailie Kinloch Anderson, who presided, to be very satisfactory—considering it was the summer month. Of course, it must not be lost sight of that the increase may not be so large a little later on, when people will be returning to coal-fires. There has been a very great advance in the use of gas for cooking and heating since the Commissioners last reduced the price; and the greatest demand for gas for cooking is in the summer, when many families do without a coal-fire altogether, or only occasionally light one.

The Commissioners have decided on a very cautious experiment in prepayment meters. On the recommendation of the Works Committee, they have resolved to authorize the Engineer (Mr. Herring) to introduce such meters, registering 20 cubic feet for a penny, in number not less than twelve at one time, into houses not already supplied with meters.

The subject of the condition of the two chimneys in the Edinburgh works was before the Commissioners; but what was done was not divulged. All that was made public was that the Works Committee had held a meeting immediately before that of the Commissioners, at which Mr. Herring reported, as the Chairman said, "both in respect of the new chimney, which was not getting on very satisfactorily, and in respect of the safety and the continuing in use of the old chimney." This week I am tempted to make use of a quotation from Burns respecting "The Brigs o' Ayr," where he makes the auld brig say to the new brig: "I'll be a brig when ye're a shapeless cairn." But on reflection I confess it would be going beyond the record to apply this remark to the new chimney in Edinburgh; for the complaint regarding it is not as to its stability—it is the connecting-flues which are giving trouble. A new flue is to be built; and perhaps the trouble will then be overcome.

A bothering discussion arose upon the terms of supply of gas for the lighting of common-stairs in Edinburgh. By a resolution of the Town Council, the cost of supplying gas and extinguishing those lights has this year been thrown on the rates, entailing a charge of £6075. This sum the Town Council would like reduced; and they have asked the Gas Commissioners to take less. The Commissioners naturally seem indisposed to do so; and a correspondence has taken place on the subject. The Works Committee of the Commission recommended that a Sub-Committee should consider the subject and report. There was no objection to this; but Mr. Waterston desired that the Sub-Committee be instructed that, if the Corporation burnt more gas than they paid for, they should be dealt with as ordinary consumers, and the gas be turned off. Mr. Waterston moved this instruction in the Commission, and backed it up, in his characteristic style, with a good deal of reflection on the exercise of partiality by the Commissioners. The Corporation official in charge of the lighting, he said, had admitted to the Commissioners that far more gas was being burnt in common-stairs than was paid for; and he thought this should be dealt with in the ordinary way. The Chairman believed that Mr. Waterston was premature with his proposal, as the Sub-Committee might recommend what he desired; and he thought they should have their report first. This became the finding of the Commissioners, by a large majority; and it is one which I think most sensible persons will endorse.

The Commissioners then took up consideration of their annual accounts. The Finance Committee, having examined them and found them correct, recommended the Commissioners to set apart for the sinking funds the statutory minimum contribution of £9012 18s. 4d., and to carry forward to next year the balance of £24,480 1s. 2d. It will be remembered that the accounts (a summary of which was published in the "JOURNAL" for June 29) brought out a deficit on the year's working of £239 14s., but that a sum of £33,732 13s. 6d. had been brought forward from the preceding year; and it was from this that the contributions to the sinking fund were to be drawn. Mr. John Jamieson moved the approval of the report. There was a good deal, he said, to encourage an optimistic view regarding their accounts, because they had an accumulated sinking fund of £82,000, besides which they paid about £12,000 in discharging mortgages and annuities, while they had a reserve fund of £3000; and just now, after meeting the charges falling due for the sinking fund, they were carrying forward a balance of £24,480. At the same time, their accounts gave some little concern, seeing that for two years their profit on the gas concern had failed to meet the yearly expenditure involved in the sinking fund. While they had been able to give a very cheap gas for a number of years—cheaper than was ever known in the records of Edinburgh—they should have endeavoured to make ends meet. The Act provided that the sinking fund was one of the charges on the year's revenue; and while from the fact that they took over the undertaking in the month of August that charge had not fallen due, he thought every member of the Committee would admit it ought to be earned as part of the revenue of the year ending May 15. He also contended that renewals, in the way of new mains and service-pipes, should be made at the expense of revenue; and he urged that the Commissioners should see they earned a little more for this purpose, as well as for the purpose of providing for the sinking

GAS AND WATER COMPANIES' STOCK AND SHARE LIST (see ante, p. 264).

Issue.	Share.	When Dividend.	Dividend or Dividend & Bonus.	NAME.	Closing Prices.	Rise or Fall in Wk.	Yield upon Investment.
£			p. c.	GAS COMPANIES.			£ s. d.
590,000	10	9 Apl.	10½	Alliance & Dublin 10 p. c.	23—25	..	4 4 0
100,000	10	,,	7½	Do. 7 p. c.	17½—18½	..	4 1 1
300,000	100	1 July	5	Australian (Sydney) 5 % Deb.	105—108	..	4 12 8
200,000	10	27 May	7	Belgrano (B. Ayres), Limited	9½—10	..	7 0 0
100,000	Stck.	29 June	5	Do. 5 p. c. Deb. Stk	103—106	..	4 14 4
200,000	5	27 May	6½	Bombay, Limited	6½—7	..	4 5 9
40,000	5	,,	6½	Do. New, £4 paid	5½—5¾	..	4 10 7
380,000	Stck.	26 Feb.	12	Brentford Consolidated	300—305	+2	3 18 8
240,000	,,	,,	9	Do. New	223—228	..	3 18 7
50,000	,,	,,	5	Do. 5 p. c. Pref.	145—150	..	3 6 8
159,375	,,	11 June	4	Do. 4 p. c. Deb. Stock.	132—136	+2	2 18 10
220,000	Stck.	26 Mar.	11½	Brighton & Hove Original	273—278	..	4 2 8
208,820	,,	,,	8½	Do. A Ord. Stk.	201—206	..	4 2 6
933,500	Stck.	26 Feb.	5	Bristol, 5 p.c. max.	130—135	..	3 14 1
420,000	20	26 Mar.	11½	British	56—57	..	3 18 11
50,000	10	26 Feb.	11½	Bromley, Ordinary 10 p. c.	23—25	..	4 12 0
71,000	10	,,	8½	Do. 7 p. c.	18—20	..	4 5 0
500,000	10	28 Apl.	6	Buenos Ayres (New) Limited	10½—11½	..	5 4 4
200,000	100	1 July	6	Do. 6 p. c. Deb.	—	..	—
150,000	20	15 July	8½	Cagliari, Limited	30—32	..	5 3 1
100,000	10	11 June	8	Cape Town & District, Ltd	16½—17½	..	4 11 8
50,000	50	3 May	6	Do. 6 p. c. 1st Mort.	58—59	+½	5 1 8
550,000	Stck.	9 Apl.	13½	Commercial Old Stock	343—348	..	3 17 6
165,000	,,	,,	10½	Do. New do.	257—262	..	4 0 1
165,000	,,	11 June	4½	Do. 4½ p. c. Deb. do.	155—158	..	2 16 11
800,000	Stck.	11 June	13	Continental Union, Limited.	253—258	..	5 0 9
200,000	,,	,,	10	Do. 7 p. c. Pref.	212—217	..	4 12 2
51,600	Stck.	26 Feb.	14	Croydon Com'cial A 10 p. c.	317—322	..	4 6 11
163,400	,,	,,	11	Do. B 7 p. c.	255—260	..	4 4 7
535,000	Stck.	26 Feb.	5½	Crystal Palace Ord. 5 p. c. Stk	139—142	..	3 13 11
60,000	,,	,,	5	Do. 5 p. c. Pref.	140—143	..	3 9 11
486,090	10	29 July	11	European, Limited	24½—25½*	..	4 6 3
354,060	10	,,	11	Do. £7 10s. paid	17½—18½*	..	4 9 3
5,896,590	Stck.	12 Feb.	12¾	Gaslight & Coke, A, Ordinary	313—318	..	4 0 2
100,000	,,	,,	4	Do. B, 4 p. c. max.	113—118	..	3 7 10
665,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	317—322	..	3 2 2
30,000	,,	,,	5	Do. F, 5 p. c. Prf.	150—155	..	3 4 6
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	220—225	..	3 6 8
1,300,000	,,	,,	7	Do. H, 7 p. c. max.	207—212	..	3 6 0
463,000	,,	,,	10	Do. J, 10 p. c. Prf.	315—320	..	3 2 6
476,000	,,	,,	6	Do. K, 6 p. c. Prf.	182—187	..	3 4 2
1,061,150	,,	11 June	4	Do. 4 p. c. Deb. Stk.	138—141	..	2 16 9
294,850	,,	,,	4½	Do. 4½ p. c. do.	155—158	..	2 16 11
908,000	,,	,,	6	Do. 6 p. c. do.	205—210	..	2 17 1
70,000	10	13 May	6	Hongkong & China, Limited	13½—14½	..	4 2 9
3,800,000	Stck.	13 May	10	Imperial Continental	224—229	..	4 7 4
376,400	100	1 Feb.	4	Do. 4 p. c. Debs. Red.	100—103	..	3 17 8
473,600	Stck.	12 Feb.	3½	Do. 3½ p. c. Deb. Stk ,,	104—107	..	3 5 5
75,000	5	29 June	6	Malta & Mediterranean, Ltd.	5½—6	..	5 0 0
560,000	100	1 Apl.	5	Met. of Melbourne, 5 p. c. Deb.	112—114	..	4 7 8
250,000	100	,,	4½	Do. 4½ p. c. Debs.	107—109	..	4 2 7
541,920	20	11 June	5	Monte Video, Limited	15—16	+½	6 5 0
150,000	5	27 May	8	Oriental, Limited	8½—8¾	..	4 11 5
135,000	5	,,	8	Do. New, £4 10s. paid	7½—7¾	..	4 12 10
15,000	5	,,	8	Do. do. 1879, £1 paid	1⅞—2	..	4 0 0
60,000	5	26 Mar.	7	Ottoman, Limited	5—5½	..	6 7 3
420,000	100	3 May	6	People's Gas } 1st Mtg. Bds.	104—109	..	5 10 1
500,000	100	1 June	6	of Chicago } 2nd Do.	105—110	..	5 9 1
250,000	10	27 May	10	San Paulo, Limited	14½—15½	..	6 9 0
5,475,000	Stck.	26 Feb.	5½	South Metrop., 4 p.c. Ord.	146—149	+1	3 10 5
1,416,667	,,	15 July	3	Do. 3 p.c. Deb. Stk.	105—109	..	2 15 0
60,000	Stck.	12 Mar.	11½	Tottenham & Edmonton, A	275—285	..	4 0 10
60,000	,,	,,	8½	Do. B	190—200	..	4 5 0
182,380	10	27 May	10	Tuscan, Limited	13½—14½	..	6 18 0
149,900	10	1 July	5	Do. 5 p. c. Debs. Red.	100—103	..	4 17 1
				WATER COMPANIES.			
746,159	Stck.	29 June	10½	Chelsea, Ordinary	334—338	..	3 2 1
150,000	,,	,,	5	Do. 5 p. c. Pref.	177—180	..	2 15 6
160,000	,,	,,	4½	Do. 4½ p. c. Pref. Stk., 1875	157—160	..	2 16 3
175,785	,,	26 Mar.	4½	Do. 4½ p. c. Deb. Stock	160—165	..	2 14 6
1,720,560	Stck.	9 Apl.	7	East London, Ordinary	223—228	..	3 1 4
654,740	,,	29 June	4½	Do. 4½ p. c. Deb. Stk.	163—166	..	2 14 3
390,000	,,	,,	3	Do. 3 p. c. Deb. Stk.	106½—107½	..	2 15 10
700,000	50	11 June	7½	Grand Junction, 10 p.c. max.	120—125	..	3 0 0
295,000	Stck.	26 Mar.	4	Do. 4 p. c. Deb. Stk.	148—153	..	2 12 4
708,000	Stck.	12 Feb.	12	Kent	347—352	..	3 8 3
160,000	,,	,,	7	Do. New, 7 p. c. max.	212—217	..	3 4 0
1,043,800	100	29 June	9¾	Lambeth, 10 p. c. max.	285—290	..	3 7 2
406,200	100	,,	7½	Do. 7½ p. c. max.	217—222	..	3 7 7
350,000	Stck.	26 Mar.	4	Do. 4 p. c. Deb. Stk.	147—150	..	2 13 4
500,000	100	12 Feb.	13	New River, New Shares.	437—442	..	2 18 9
1,000,000	Stck.	29 July	4	Do. 4 p. c. Deb. Stk.	151—154*	..	2 11 11
902,300	Stck.	29 June	5	S'thwk & V'xhall, Ordinary	160—163	..	3 1 3
126,500	100	,,	5	Do. Do. 7½ p. c. Max.	151—154	+1	3 4 11
489,200	Stck.	,,	5	Do. Do. 5 p. c. Pref.	173—178	..	2 16 2
1,019,585	,,	9 Apl.	4	Do. 4 p. c. A Deb. Stk.	145—148	..	2 14 2
1,155,066	Stck.	11 June	10	West Middlesex	312—317	..	3 3 1
200,000	,,	,,	4½	Do. 4½ p. c. Deb. Stk.	162—167	..	2 13 11

*Ex div.

fund. He suggested that, as in the Town Council, they should have estimates made of income and expenditure at the beginning of the financial year. The Chairman explained that their reserve fund was £3500, and that the amount of £24,480 was simply a sum carried forward; and their endeavour was to use it so as to prevent the price of gas from fluctuating. Mr. Mallinson introduced the old subject of the illuminating power, in the question whether it would not be advisable to have a report from the Engineer upon the reduction in the quality of the gas to about 21-candle power. The Chairman cut the matter short by the remark that the subject must be brought up by substantive motion. The Treasurer (Mr. Gibb) explained that at the time they fixed the price of gas last year, the prices of residuals were so low that it was thought by their Engineers that they would not go lower; but they did. The average amount they had received per ton of coal was 2·32d. less than in the preceding year, and less than they estimated it would be. Last year they carbonized 11,699 tons of coal more than in the year before; and they would see that if the prices of residuals had remained the same as when they estimated, in place of their having a deficit, they would have had a surplus. As it was, they had actually received £424 less for residuals; and this was upon 11,699 tons more coal. After this gentle breeze, the accounts were approved and certified, and the recommendations of the Finance Committee were adopted.

Then Mr. Jamieson re-introduced his scheme for the superannuation of the employees of the Commission. He explained that the employees, it was proposed, should contribute 3 per cent. of their incomes, and the Commissioners a like sum. On the basis of the scheme coming into operation at the end of ten years, the annual contribution of the Commissioners would be £1819; but if it were to be brought into operation in five years, it would be £2819 for the first five years. He proposed that the Commission be authorized to enter into conferences with the Corporations, and with the Edinburgh and District Water Trust, with a view to the establishment of a general scheme. This was agreed to. The scheme as proposed is not what it should be. In the first place, it should come into operation at once; and, indeed, although it did, it would be manifestly unfair to compel, say, winter hands, who only get six months' or so employment, to subscribe to the superannuation of the permanent hands; and in the second place, superannuation should be provided by the employees themselves. It is a subject, however, which had better be left alone.

A meeting was held last Saturday of the newly-reconstructed Gas Company at Pitlochry, at which it was intimated that all the shares had been applied for, and that therefore no prospectus would be issued to the public. The Manager reported that during the past year the output of gas was nearly 3 million cubic feet, which was an increase of 2650 cubic feet.

The fiftieth annual general meeting of the Airdrie and Coatbridge Water Company was held on Tuesday. It was reported that Sheriff Jameson, the Oversman in an arbitration between the Company and Lord Lamington with reference to payment by the Company for land occupied by the Company's new reservoir at Cowgill, above Biggar, and for way-leave for the main-pipes, proposed to find the Company liable in £5700 2s., but that the Directors intended to take exception to the Sheriff's findings. The first section of the pipe contracts, from Cowgill to Symington, a distance of eight miles, has been completed. The gross assessments for the year showed an increase of £684. The report was adopted; and dividends at the maximum rates were declared.

In a discussion this week in the Edinburgh Town Council upon public lighting, it was stated that the Corporation's account for electricity for the street-lamps was £8970, as compared with a charge of £2612 for gas. So, after all, it is the Corporation money which makes the mare to go. Take it away, and where would the electric lighting undertaking credit balance be?

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *July* 31.

Sulphate of Ammonia.—The market is a shade easier on the week, though the quotations remain £7 8s. 9d. to £7 10s. per ton f.o.b. Leith, £7 10s. per ton f.o.b. Hull, and £7 11s. 3d. to £7 12s. 6d. per ton f.o.b. Liverpool. A fair quantity of stuff has been offering; but there has been no great pressure to sell. On the other hand, direct export orders have been scarce; and the market has had to depend mainly upon requirements to "cover" contracts. In the forward position, interest has declined, though there are speculative sellers up to the end of the year on about the level of spot prices. For spring delivery, a premium might still be obtained; but buyers are not at all keen. It is hoped that the active propaganda decided upon by the Committee of Manufacturers may result in further extending the use of sulphate of ammonia in the place of nitrate of soda. But time will be required to effect this end; and any substantial impression upon prices can hardly be expected in the immediate future.

Nitrate of Soda is very quiet in all positions; and spot quotations remain 7s. 4½d. per cwt. for ordinary, and 7s. 6d. per cwt. for fine quality.

LONDON, July 31.

Tar Products.—Dealers are again offering less price for benzols, with a view to depressing this article. There is still great firmness in the prices of tar oils, with an absence, however, of any demand at the moment for naphthalene. More activity is observed in regard to anthracene, it being rumoured that important sales have taken place.

The following prices have obtained during the week: Tar, 16s. to 20s. Pitch, 19s. to 20s. 6d. Benzols, 90's, 1s. 10d.; 50's, 1s. 11d. Toluol, 2s. 1d. Solvent naphtha, 1s. 6d. Crude, 30 per cent., naphtha, 10½d. Creosote, 2¼d.; liquid, 3d. Heavy oils, 42s. 6d. Carbolic acid, 60's, 1s. 9d. Pressed naphtha, 40s. Creosote salts, 20s. Anthracene, "A" quality, 6d; "B," 5d.

Sulphate of Ammonia moves off freely, without any marked change in value. There is a capital inquiry for forward delivery, and a little better price will be paid for it. £7 10s., less 3½ per cent., may be taken as the value at all ports.

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COAL TRADE REPORTS.

From Our Own Correspondents.

Lancashire Coal Trade.—Outside the better qualities of round coal, suitable for house-fire purposes, which continue necessarily in the slowest possible demand, other descriptions of fuel are moving off fairly well; and except perhaps a slight easing down in shipping prices for steam coal generally, a steady tone is being maintained. Of course, here and there for special sales of quantities low quotations are made; but these are mostly temporary transactions, and do not govern the market generally. For house coals, collieries are mostly maintaining list rates at about 9s. 6d. to 10s. and 10s. 3d. per ton for best Wigan Arley; 8s. to 8s. 6d. for Pemberton four-feet and seconds Arley; and 6s. 6d. to 7s for common house coal. Steam and forge coals continue in fair demand for inland requirements; the engineering strike having so far had no appreciable effect upon requirements of consumers. Prices are steady at about 6s. to 6s. 3d. per ton at the pit. Engine fuel is in active request, with rates firm; slight advances being here and there secured on long forward contracts over the ensuing twelve months. Common slack averages 3s. 6d. per ton; medium, 3s. 9d. to 4s 3d; and best sorts, 4s. 6d. to 5s. Shipping business is moderate; but prices are easier—ordinary steam coal being quoted about 6s. 3d. to 6s. 9d. per ton delivered Mersey ports.

Northern Coal Trade.—There has been an increased demand for coals for the last few days, and the tendency of prices has been firmer; this remark applying to both gas and steam coal. Best Northumbrian steam coals are 8s. 9d. per ton f.o.b.; second qualities, about 8s.; and steam smalls, 3s. 6d. to 3s. 9d. One or two strikes at local collieries are rather reducing the production and stiffening the prices. The gas coal trade is rather firmer again; and the price is maintained. Generally the quotation is about 7s. per ton f.o.b.; but one of the leading producers asks 7s. 6d., and is believed to have contracted for a quantity at that price, for delivery over the winter months. The production of gas coals seems to be larger than usual at this period of the year. Manufacturing coals are quieter, the strike of the engineers having lessened the local demand; but on the whole, the reduction is much less than had been anticipated. Exports of gas coke are a little larger.

Scotch Coal Trade.—After the holidays, the demand has again become active; and as the men are working steadily now, trade is healthy—the only black outlook being the engineering trouble. The prices quoted are: Main, 6s. 3d. to 6s. 6d. per ton f.o.b. Glasgow; ell, 7s. to 7s. 6d.; and splint, 6s. 9d. to 7s. The shipments for the week amounted to 129,932 tons—a decrease of 42,601 tons upon the previous week, and of 6231 tons upon the corresponding week of last year. For the year to date, the total shipments have been 4,262,758 tons—an increase upon the same period of last year of 146,642 tons.

The Proposed Purchase of the Mid-Sussex Water-Works by the Cuckfield District Council.—At a meeting of the Cuckfield Rural District Council on Tuesday, the Clerk reported that he had given notice to the Mid-Sussex Water Company of the decision of the Council to purchase their undertaking. The Council now resolved to appoint Mr. J. Mansergh, M.Inst.C.E., as their Arbitrator, and request him to at once make a thorough inspection of the works.

Additional Capital for the Aldershot Gas and Water Company.—By order of the Directors of the above-named Company, Mr. Alfred Richards sold by auction, at the Mart, on Monday last week, 300 £10 preference shares (5 per cent.) in the concern, 100 of which were knocked down at £13 10s. each, 50 at £13 7s. 6d., 90 at £13 5s., and 60 at £13 2s. 6d. apiece.

The Question as to the Basis of Water-Rates at Portsmouth.—The Water Committee of the Portsmouth Town Council have decided to obtain another Counsel's opinion as to whether the Water Company are entitled to base the water-rate on the gross annual rental of the premises supplied or upon the rateable value. Opinions already obtained from Sir Edward Clarke and Mr. H. Asquith differ. Mr. Balfour Browne or Mr. Cripps is to be consulted.

Shipley Gas Company.—The report of the Directors of this Company for the year ended June 30 shows an expenditure on capital of £930; the total outlay on this account being now £108,554. The income from the sale of gas and residual products was £23,965, of which £7614 was profit. The usual dividends of 10 per cent. on the original stock and 7 per cent. on the new ordinary stock have been declared. At the annual meeting of the shareholders, reference was made to the death of Mr. George Vint, who for twenty-seven years was Chairman of the Board.

The Crystal Palace District Gas Company's Recent Case.—At a meeting of the Beckenham Urban District Council on Friday, the Clerk said the time had gone by for the Crystal Palace District Gas Company to appeal against the decision of the Magistrates who confirmed the conviction of the Company by the Bromley Justices for supplying gas which was not of the standard quality. The costs had been taxed, with the result that the Company would, besides defraying their own costs, have to pay £76 towards those of the Beckenham Council. He stated that since the prosecution the quality of the gas had been appreciably better; and Dr. Rideal had reported that his tests had been satisfactory.

Sale of the Colnbrook Gas-Works.—In accordance with the announcement contained in recent issues of the "JOURNAL," Mr. Alfred Richards offered for sale at the Auction Mart, on Monday last week, by order of the Directors of the Colnbrook Gas Company, Limited, the above-named gas-works as a going concern. It is not often that an opportunity is afforded of acquiring an entire gas undertaking; and the event excited a good deal of interest, as evidenced by the fact that the room was crowded with gas men. When the biddings reached £550, they hung fire; but on the Auctioneer announcing that the concern was in the market, and would be sold at the fall of the hammer, competition revived, and the bids went up to £745, at which the works were sold. The buyer will take possession on the completion of his purchase; and, with proper management, he ought not to have reason to regret having made the investment.

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"JOHN J. JERVIS,
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28/6/1897.

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"I am, yours faithfully,
"(Signed) JOHN J. JERVIS,
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"J. T. WESTCOTT, Esq.

N.B.—The M.-W.-P. Plant is built under penalty to Manufacture Gas on less Raw Material than any other Plant on the Market.

All Enquiries to be Addressed to the Company's Offices.

Reduction in Price.—The Directors of the Truro Gas Company have decided to reduce the price of gas by 2d. per 1000 cubic feet—from 3s. 5d. to 3s. 3d. net.

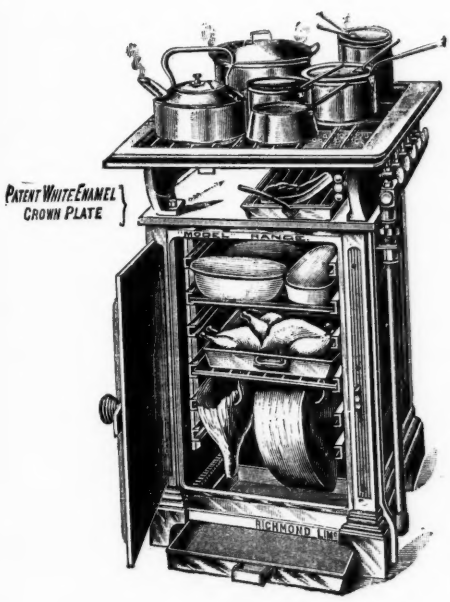
The Clacton-on-Sea District Council and the Water-Works.—At a meeting of the Urban District Council of Clacton-on-Sea last Wednesday, the Clerk reported that he had served a notice on the Water Company, under section 52 of the Public Health Act, 1875, calling upon them to provide the inhabitants with 20 gallons of water per head per day. It was decided to purchase twelve water-meters for testing the quantity, and to take a census of the population between July 31 and Aug. 25 for the purpose of proceeding under the Act mentioned. It was resolved to appoint Mr. Baldwin Latham, M.Inst.C.E., as Arbitrator, with a view to the purchase of the Company's works.

The Ossett Corporation and the Gas-Works.—The Ossett Corporation (says the "Wakefield Express") have still got their eyes upon the gas-works; and another endeavour is to be made to municipalize the concern. Seeing that Horbury as well as Ossett is supplied with gas by the same undertaking, the Horbury District Council have been once more approached with a view of obtaining their co-operation in the purchase. There is an initial difficulty in a joint ownership—who is to manage the undertaking if it pass out of private hands? This has hitherto seemed an insurmountable barrier to joint action. But the Corporation have invited the District Council to discuss the situation; and evidently anticipate that a satisfactory arrangement may be made. The latter are not averse to consider the matter, and have requested the Corporation to submit their proposals in writing, and afterwards a conference between the two authorities will be held.

The London Chamber of Commerce and the Consumption of Gas.—The consumption of gas has been one of the subjects recently discussed by the Textile Trade Section of the London Chamber of Commerce, a number of firms having complained that during the last six months there has been a very marked increase in the consumption of gas—ranging, in fact, from 25 to 35 per cent. This increase was attributed by some of the members to the introduction of water gas, which, not having the same illuminating power as coal gas, caused a larger quantity to be burned. As Chairman of the Section, Mr. A. J. Hollington wrote to the Secretary and General Manager of The Gaslight and Coke Company (Mr. J. W. Field), and inquired if the statements made about water gas were correct, and, if so, whether some information could be given for the guidance of the Chamber, which represents some of the largest gas consumers in the Metropolis. He also asked as to the probability of the price of gas being reduced. In reply, Mr. Field said the reasons alleged for the increase were absolutely without foundation; and he presumed that the real cause of the increase in the consumption of gas was the general improvement of trade throughout London. As to what was termed "the present high price of gas," he added that until there was a definite improvement in the market for coke and other residual products, the consumers of gas in London could not expect any reduction in the current charge.

Devonport Gas Company.—The 53rd annual meeting of this Company was held last Friday week—Mr. R. C. Smith presiding. The Directors in their report stated that the sales of gas showed an increase of 5 per cent. over those of the previous year; but in the proceeds from residuals there had been a considerable falling off, arising from the continued decline in the price of sulphate of ammonia. The gross revenue for the year amounted to £29,435, as compared with £28,720 in the preceding year; showing an increase of £715. The expenditure, including depreciation, amounted to £23,698; leaving a balance of £5337. After payment of the dividends authorized at the last general meeting, there remained a balance of £9267, from which the Directors recommended the declaration of the statutory dividend of 10 per cent. on the ordinary shares and 6 per cent. on the guaranteed shares, free of income-tax; carrying forward the balance. Negotiations had been opened with the Manor Office, with a view to the acquisition of the freehold of the works; and the Directors had pleasure in announcing that arrangements had been made with Lord St. Levan whereby the reversionary interest in the land, buildings, plant, and works was now vested in the Company. The report was adopted; and the dividends recommended—viz., 10 per cent. on the ordinary shares and 6 per cent. on the guaranteed shares, free of income-tax—were declared.

Cambridge Gas Company.—The half-yearly meeting of this Company was held on the 22nd ult., when the Directors recommended the payment of dividends of 10 and 7 per cent. on the two classes of stock. In their report, they also asked the shareholders to authorize the creation and sale of 200 £10 shares. The Board also expressed their regret that, since the last meeting, they had lost (by retirement) the valuable services of their highly-esteemed Manager, Mr. O. J. Weeks. The vacancy thus caused had been filled by the appointment of Mr. Richard Brown, who was formerly Assistant Engineer and Manager of the Hastings and St. Leonards Gas Company. In the course of his report, Mr. Brown mentioned that the late sewerage operations had again caused a very large outlay on repairs to main and service pipes, and would probably continue to do so for some time. As to the business of the half year, he remarked that the amount received for the sale of gas was about the same as the corresponding period of the previous year; but, owing to the state of the markets for tar and ammoniacal liquor, the prices in each case had been lower. Better prices, however, had been obtained for coke. The Chairman (Mr. Dennis Adams), in moving that the above reports be adopted, referred to the retirement of Mr. Weeks, of whom he spoke in appreciative terms. The Company were very much under his guidance in selecting his successor, Mr. Brown; and all that Mr. Weeks had led the Company to expect of the new Manager had been thoroughly realized. Regarding the leakage of gas, he said it was calculated that since the sewerage operations the Company had lost 3 per cent. more than they usually did. This, however, serious though it was, would not continue for ever. The report was adopted; and the dividends were declared. The Directors were also authorized to raise the amount of capital required. The proceedings then terminated.



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The Rope-Guided Gasholder at Middlesbrough.—At a special meeting of the Middlesbrough Gas Committee last Tuesday, the tender of Messrs. Ashmore, Benson, Pease, and Co., amounting to £960, for carrying out the necessary repairs to the rope-guided gasholder was accepted.

The Cardiff Corporation Water Committee have accepted the tender of the Executors of Charles Jordon, of Newport, for the supply of pipes required for the service of water in the Penarth district. The amount of the contract is £2122.

The Edinburgh and Leith Gas Commissioners have just let to the Steel Pipe Company of Kirkcaldy a contract for the fitting up of condensers in the Leith works, at the price of £795, and have accepted the offer of the New Conveyor Company, Limited, to provide a lime elevator, at the price of £436.

Messrs. Joseph Taylor and Co., chemical plumbers, of Bolton, have recently had placed with them orders for their latest improved make of saturator for the gas-works of the Douglas (Isle of Man) Gas Company, the Kingston-on-Thames Gas Company, the Kendal Corporation, and the Ulverston District Council. They have also received instructions to supply sulphate stores and drainers for Wallasey, Ratcliffe, and Heywood.

The Grantham Gas Company, acting on the advice of their Engineer (Mr. R. G. Shadbolt), have commenced carrying out a scheme of reconstruction at their works. The first section, consisting of a retort-house and coal-stores, has been put in hand; the building being entrusted to Messrs. Rudd and Son, of Grantham, and the roofs and bench to Messrs. R. Dempster and Sons, of Elland. The retorts throughout will be set on Mr. W. R. Chester's regenerative principle through beds of eights.

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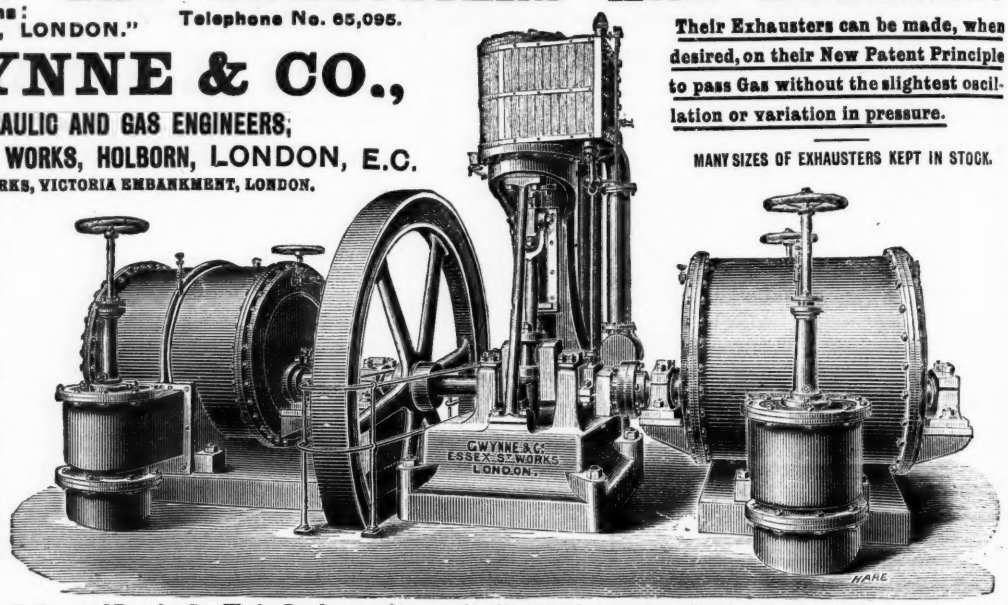

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Address No. 2886, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, Retort Setters and Bricklayers.
Apply to R. DEMPSTER AND SONS, LIMITED, Elland, YORKS.

GAS Stokers (Two) wanted, used to Shovel Charging, and Engine and Boiler. Permanent job to steady Men. Wages 4s. 6d. per twelve-hour Shift.
Apply, by letter only, to T. LAYTON, Manager and Secretary, Gas-Works, REDDITCH.

WANTED, a Draughtsman for Engineer's Works. Must be capable of making Detail Working Drawings.
Apply, by letter, stating Age, Experience, and Wages required, to No. 2889, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

WANTED, a Foreman of Water-Works Pumping-Station in Staffordshire. Wages 32s. per week, with House and Coal.
Apply, in own handwriting, stating Age, Married or Single, and giving full Information as to previous Experience, with References or Testimonials, to No. 2888, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

COLOMBO GAS AND WATER COMPANY, LTD.

WANTED, an Assistant, with a thorough knowledge of Gas Making and Distribution, capable of taking charge of Works during Manager's absence. A young Man with a good Mechanical Training and a knowledge of Electricity preferred. Salary £200 per annum, with free Passage out and home.
Apply, by letter, to JOHN SPROXTON, Secretary, 148, Gresham House, LONDON, E.C.

CROMER WATER-WORKS COMPANY, LIMITED.

WANTED, a steady reliable Man as INSPECTOR and WORKING FITTER. He must be a thoroughly practical Plumber, able to undertake Inspection of House Fittings, Main and Service Laying, and general Repairs, and also capable of taking charge of Pumping Machinery if required. Wages, 35s. a week.
Applications, in Candidates' own handwriting, stating Age and Experience, with *copies* of Testimonials, to be sent to me not later than Wednesday, Aug. 11.
By order,
P. E. HANSELL,
Secretary.
Cromer, July 28, 1897.

GAS CARBON Wanted, not less than 4-Ton Loads.
Apply to the BRIMINGTON CARBON COMPANY, Sowerby Bridge, YORKS.

FOR SALE—A Station Meter complete, in thorough working order. Recently overhauled and certified correct by Messrs. Braddock. Capacity, 50,000 feet per hour.
Apply to JOHN H. DARBY, Brymbo, near WREXHAM.

FOR SALE—Round Station Meter, 6-inch Connections (6000 Cubic Feet of Gas per hour). Certificate of thorough working order.
Address No. 2887, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—A Round Station Meter, to pass 1500 cubic feet of Gas per hour. In good condition. Being replaced by larger.
Also a set of Four PURIFIERS, in good condition.
For further Particulars, apply to W. A. CLARKE, Selborne Buildings, Millstone Lane, LEICESTER.

GAS PLANT for Sale—I can always offer NEW and SECOND-HAND GAS APPARATUS, including Retorts and Fittings, Condensers, Exhausters, Scrubbers, Washers, Purifiers, Gasholders, Tanks, Valves, Connections, &c. Also COMPLETE WORKS equal to 7000, 20,000, 50,000 cubic feet per diem. **Inquire and compare Prices and Particulars before ordering elsewhere.**
J. F. BLAKELEY, Gas Engineer, Ravensthorpe, YORKS.

BLUE PRINTS of all kinds in any weather. Drawings and Tracings promptly executed.
J. L. FEATHERSTONE, 21, Old Queen Street, WESTMINSTER, S.W.

ALEX. P. KER, C.E., Consulting Gas Engineer, Hunton Road, Gravelly Hill, Birmingham, 25 Years Assistant Engineer and Manager of Works to the Corporation of Birmingham and their predecessors, MAY BE CONSULTED on all matters connected with GAS ENGINEERING, including Valuations, Alterations, Additions and Extensions, &c. REPORTS upon EXISTING WORKS and IN PROGRESS. EXAMINATIONS OF GAS for ILLUMINATING POWER and IMPURITIES conducted. Plans, Specifications, and Estimates prepared.

GAS-PUMP for Sale, horizontal, one Steam Cylinder, 18-inch bore, and two Gas Cylinders, 17½-inch bore, all 24-inch Stroke, on massive Bed-Plate, with heavy Fly-Wheels. Very strong. First-Class Make. Not much used.
Apply, by letter, to No. 2878, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FOR SALE—A Station Meter, 1000 Cubic Feet per hour. Four-inch Connections and Bye-Pass. In excellent condition. Overhauled two years ago by Alder and Mackay.
For further Particulars, apply to
JAS. BRODIE,
Engineer.
Gas-Works, Kilmalcolm, N.B.

FOR SALE—Two Gasholders: One 18 ft. diameter by 14 ft. deep; and the other 20 ft. by 14 ft. In good condition, with Columns, Girders, Counterbalance Valves, and Connections complete. Also an EXHAUSTER, by Gwynne and Beale (capacity 2000 feet per hour). Has only been used Six Months.
Apply to the DRAYCOTT GAS COMPANY, Draycott, DERBY.

LEIGH URBAN DISTRICT COUNCIL.
(GAS DEPARTMENT.)

THE Gas Committee of the above Council invite TENDERS for the purchase of the surplus TAR produced at their Works for a period of One Year, from the 1st of September next.
All Particulars with Form of Tender may be obtained from the Manager, Mr. John Foster, Gas-Works, Leigh.
Sealed tenders, endorsed "Tender for Tar," to be addressed to me the undersigned at or before Twelve o'clock noon, on Monday, Aug. 16, 1897.
By order,
G. DICKINSON,
Clerk to the District Council.
Town Hall, Leigh, Lancs.,
July 23, 1897.

MOSSLEY CORPORATION GAS-WORKS.

TENDERS FOR COAL AND CANNEL.

THE Gas Committee of the above Corporation invite TENDERS for the supply of 9000 Tons of GAS COAL and 1600 Tons of CANNEL, for delivery over the Year ending Sept. 30, 1898.
Specification and Form of Tender may be obtained from the Manager (Mr. R. Merrell) at the Gas-Works.
Sealed tenders, endorsed "Tender for Coal and Cannel," to be sent to the undersigned not later than Saturday, Aug. 7 next.
The Committee do not bind themselves to accept the lowest or any tender.
By order,
JOSEPH HYDE,
Town Clerk.

GAS COAL.

THE Directors of the Newark Gas Company are prepared to receive TENDERS for the supply of 6000 Tons of best screened SOUTH YORKSHIRE GAS COAL, delivered at Newark (G.N.R.), in such quantities as may be required, during the ensuing Year from Sept. 1 next.
The Coal to be fresh wrought, free from Dirt, Bats, Shale, Pyrites, and other Impurities.
The Company reserve the right to divide the above amount.
Tenders, marked on the outside "Tender for Coal," to be sent in to me on or before Aug. 4, 1897.
For further Particulars, apply to
F. B. FOOTTIT,
Secretary.
Newark, July 19, 1897.

UXBRIDGE AND HILLINGDON GAS CONSUMERS' COMPANY.

TAR.

THE Directors are prepared to receive TENDERS for the purchase of the surplus TAR produced at their Works during the ensuing Twelve Months from the 1st of September next.
The quantity of Tar will be about 35,000 gallons, and will be delivered free into Contractors' Barges alongside the Works, on the Grand Junction Canal.
Tenders, endorsed "For Tar," must be addressed to the Chairman, and be delivered at the Company's Offices, Uxbridge, not later than Saturday Evening, Aug. 7.
The Company have no special Form of Tender; but it is suggested that the Tar should be tendered for at so much per gallon.
The Directors do not bind themselves to accept the highest or any tender.
Further Particulars may be obtained of the undersigned.
W. M. GARDINER,
Secretary.
Uxbridge, Middlesex,
July 20, 1897.

HYDRATED OXIDE OF IRON.

PREPARED from pure Iron.
Two or three times as rich as Bog Ore.
Strong action on Sulphuretted Hydrogen.
To be used alone, but will increase activity of other Oxides.
Less than half the price of Bog Ore.
Can be lent on hire.
Write for tabulated results.
READ HOLLIDAY AND SONS, LIMITED, HUDDERSFIELD.

ECONOMY IN PURIFICATION.

INCREASE the Efficiency of your PURIFIERS by adopting CRIPPS'S PATENT BYE-PASS VALVE in the lower Tiers of Sieves. Practical Experience proves their Economy. Engineers are repeating orders after thorough trial.
References and Particulars can be obtained from the Makers—
C. & W. WALKER, Midland Iron-Works, Donnington, near Newport, SALOP.
And J. EVERY & SON, Phœnix Iron-Works, LEWES.

THE Directors of the Tonbridge Gas Company invite TENDERS for the supply of a CARBURETTING PLANT for enriching Gas. Capacity 50,000 cubic feet per hour; also for the supply of SPIRIT from the 1st of September, 1897, to the 1st of September, 1898.
Tenders to be sent in by the 12th of August, to
JAMES DONALDSON,
Engineer and Secretary.

SHIFNAL GAS LIGHT AND COKE COMPANY.

TENDERS FOR COAL AND LIME.

THE Directors of the above Company invite TENDERS for supplying 400 to 800 Tons of good GAS COAL or NUTS.
Also price per Ton of best MANARA LIME.
The deliveries to be at Shifnal Station at such times and in such quantities as may be directed.
Sealed tenders to reach us on or before the 7th day of August next.
BENJAMIN FARMER,
EDWIN J. FARMER,
Joint Clerks to the Company.

FESTINIOG URBAN DISTRICT COUNCIL.

GAS COAL SUPPLY.

TENDERS invited for Screened Coal or "THROUGH AND THROUGH," and CANNEL, for a period of Twelve Months, delivered at Blaenau Festiniog Station.
Forms of Tender and Conditions may be obtained from the undersigned, to whom all tenders must be sent on or before Aug. 12.
The lowest or any tender not necessarily accepted.
W. E. A. WILLIAMS, C.E.,
Clerk and Manager.
Public Offices, Blaenau Festiniog,
July 28, 1897.

CORPORATION OF ILKESTON.
(GAS DEPARTMENT.)

THE Gas Committee invite Tenders for the supply of 6000 tons of GAS COAL for delivery during Twelve Months following Sept. 1, 1897.
Forms of Tender may be had on application to Mr. F. C. Humphrys, Gas Manager.
The Committee reserve the right to divide the Contract, and do not pledge themselves to accept the lowest or any tender.
Tenders, properly endorsed, to be sent to me not later than noon, Aug. 16, 1897.
By order,
WRIGHT LISSETT,
Town Clerk.
Town Hall, Ilkeston.

COUNTY BOROUGH OF WIGAN.

TO TAR DISTILLERS AND OTHERS.

THE Gas Committee of the Wigan Corporation invite TENDERS for the surplus TAR produced at their Gas-Works for One Year, commencing on the 1st of September next, and terminating on the 31st of August, 1898.
Particulars and Form of Tender may be obtained on application to the undersigned.
The highest or any tender not necessarily accepted.
Tenders, sealed and endorsed "Tar," to be delivered to J. J. Charnock, Esq., Town Clerk, on or before the 17th of August next.
JOS. TIMMINS,
Engineer.
Borough Gas-Works, Wigan,
July 27, 1897.

BROMLEY GAS CONSUMERS' COMPANY.

NOTICE is Hereby Given, that the ORDINARY HALF-YEARLY GENERAL MEETING of this Company will be held at the Bell Hotel, Bromley, Kent, on Thursday, the 12th day of August, at Six o'clock p.m. precisely, to receive the Report of the Directors, the Balance-Sheet certified by the Auditors, to declare Dividends, and for General Purposes.
The TRANSFER BOOKS WILL BE CLOSED from the 27th of July to the 12th of August, 1897, both days inclusive.
By order of the Board,
HENRY W. AMOS,
Secretary.
Offices at the Works, Bromley, Kent,
July 26, 1897.

NORTH OF IRELAND ASSOCIATION of GAS MANAGERS.

THE

ANNUAL MEETING

Of this Association

WILL BE HELD IN THE

COURT HOUSE, OMAGH,

ON TUESDAY, AUG. 10, 1897.

Chair to be taken at 11.30 a.m. by the Vice-President, Mr. J. NISBET, Portadown.

The Business will consist of an Address by the Vice-President; a Competition Paper, entitled "A Difference in Hydraulic Mains," by "Hydraulic;" a Description of Acetylene Gas Plant, by Mr. C. B. Outon, of Inchicore; and a Lecture (illustrated by Experiments and Lantern), by Professor W. Ivison Macadam, F.R.S.E., F.I.C., F.C.S., &c., on "Carburetted Water Gas."

By the courtesy of the Directors of the Omagh Gas Company, Luncheon will be provided for the Members. There will consequently be no dinner.

Arrangements have been made for an Excursion to Enniskillen and a Cruise on Lough Erne the day after the Meeting.

By Order of the Directors of

THE GASLIGHT AND COKE COMPANY.

ISSUE OF £25,000 "A" ORDINARY STOCK.

MR. ALFRED RICHARDS is favoured with Instructions from the Directors to SELL BY AUCTION, at the Mart, Tokenhouse Yard, London, E.C., on Monday, Aug. 9, 1897, at One for Two o'clock precisely, in Lots,

£25,000 OF "A" ORDINARY STOCK

OF

THE GASLIGHT AND COKE COMPANY,

ranking for a Standard Dividend of 10 per cent. subject to the Sliding-Scale; the last Dividend on the Company's "A" Stock having been at the rate of 12¾ PER CENT. PER ANNUM.

Particulars may be obtained at the OFFICES of the COMPANY, in Horseferry Road, WESTMINSTER; and of Mr. ALFRED RICHARDS, Auctioneer, 18, FINSBURY CIRCUS, E.C.

ISSUE OF STOCKS AND SHARES BY AUCTION UNDER PARLIAMENTARY POWERS.

MR. ALFRED RICHARDS undertakes the issuing by Auction of GAS AND WATER SHARES under Parliamentary Power.

He also holds MONTHLY SALES of GAS AND WATER SHARES at the Auction Mart, Tokenhouse Yard, E.C.

Terms for the issuing of Capital, and also for offering to auction Gas and Water Shares, and all Particulars relating thereto, may be had of Mr. Alfred Richards.

Offices: 18, FINSBURY CIRCUS, E.C.

By Order of the Directors.

TO TRUSTEES, INVESTORS, AND OTHERS.

NOTICE of Sale by Auction by Messrs. CRAWTER, at the Mart, Tokenhouse Yard, E.C., on Wednesday, Aug. 11, 1897, at Two o'clock precisely, of 625 SHARES of £10 each in the WALTHAM ABBEY AND CHESHUNT GAS AND COKE COMPANY, and known as "C" Shares, which, according to the present Price of the Company's Gas, entitles the Purchasers to a Dividend, when earned, of 10½ per cent.; thus offering a sound Investment of the most solid kind.

Particulars may be obtained at the OFFICES of the Company, Waltham Abbey, Essex; at the Mart; of Mr. J. CRAWTER, Land Agent, 41, BEDFORD ROW, W.C.; or of Messrs. CRAWTER, Land Agents and Auctioneers, Cheshunt, HERTS.

E. ASQUITH & CO.,

Hydraulic Engineers,

17, Mather Street, Ancoats, Manchester,

Fit up Plants for

Pressing Anthracene, Naphthalene, &c.

Competent Men sent out to erect same. Estimates given.

PRICE'S COKE & COAL BARROW

effects a great saving of time, labour, and expense.

For Particulars, Price, &c., apply to Mr. EDWARD PRICE, 119, Queen's Road, FINSBURY PARK, N.

Prices are Reduced.

HEATHCOTE GAS COAL.

Rich in Illuminating Power and Yield of Gas. Above the Average in Weight and Quality of Coke.

Maintains a High Standard in Residuals.

THE GRASSMOOR CO., LD.,

CHESTERFIELD.

NEWBATTLE CANNEL.

Highest Results in Gas, & Excellent Coke.

QUOTATIONS ON APPLICATION TO

THE LOTHIAN COAL COMPANY,

LIMITED,

NEWBATTLE COLLIERIES,

DALKEITH, N.B.

JAMES OAKES & Co.,

ALFRETON IRON-WORKS, DERBYSHIRE,

AND

Wenlock Iron Wharf, 21 & 22, Wharf Road, CITY ROAD, LONDON, N.,

Manufacture and keep in Stock at their Works (also large stock in London)

PIPES and CONNECTIONS, 1¼ to 48 inches in diameter, and make and erect to order RETORTS, PURIFIERS and TANKS, with or without planed joints, COLUMNS, GIRDERS, SPECIAL CASTINGS, &c., required by Gas, Water, Railway, Telegraph, Chemical, Colliery, and other Companies.

NOTE.—Makers of HORSLEY'S PATENT SYPHONS. These are cast in one piece, without Chaplets; doing away with bolts, nuts and covers, and rendering leakage impossible.

LONDONDERRY GAS COALS

FROM THE

MARQUIS OF LONDONDERRY'S COLLIERIES,

COUNTY OF DURHAM.

Available output up to 5000 tons per day. Yield of Gas 11,000 cubic feet per ton of Coal as per analysis by Mr. John Pattinson, F.C.S., F.I.S.

FOR PRICES AND PARTICULARS, APPLY TO

S. J. DITCHFIELD,

SEAHAM HARBOUR, COUNTY OF DURHAM.

HOLMSIDE GAS COALS.

PRESENT DAILY PRODUCE OVER 4000 TONS.

LATEST ANALYSIS—By CHARLES PHILLIPS, Gas Examiner to Rotherham Corporation.

Yield of Gas Per Ton . . 11,205 Cubic Feet.
Illuminating Power, 16 7/10 Stand. Sperm. Candl.
Coke (of good & pure quality) 13⅜ Cwt. Per Ton.
Sulphur . . . . A little over 1 Per Cent.
Ash . . . . . Under 1 Per Cent.
Tar . . . . . 163 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 103 Lbs. (Avoir.) Per Ton.

HOLMSIDE GAS COALS are supplied to the largest Gas Companies in England and on the European Continent; London alone consuming about half the produce.

SOUTH MOOR PELTON GAS COALS.

PRESENT DAILY PRODUCE AVAILABLE 2500 TONS.

RESULTS OF DIFFERENT ANALYSES:—

Yield of Gas Per Ton . . 10,500 Cubic Feet.
Illuminating Power . 17 Stand. Sperm Candl.
Coke (of excellent quality) . 13½ Cwt. Per Ton.
Sulphur . . . . . 1·13 Per Cent.
Ash. . . . . 1·34 Per Cent.
Tar. . . . . 180 Lbs. (Avoir.) Per Ton.
Ammoniacal Liquor 94½ Lbs. (Avoir.) Per Ton.

The HOLMSIDE and SOUTH MOOR COALFIELD possesses *a very great quantity of the best Coal;* and, whilst other Coal-Fields are becoming exhausted, this one is only being opened out, so that *the quality* of both the HOLMSIDE COALS, and the SOUTH MOOR COALS *may be relied upon for all practical purposes.*

These Coals may be bought through the Principal Merchants in England, or direct from

MR. MARK ARCHER,

HOLMSIDE AND SOUTH MOOR OFFICES, NEWCASTLE-UPON-TYNE.

TROTTER, HAINES, & CORBETT,

Brettell's Estate

FIRE-CLAY & BRICK WORKS,

STOURBRIDGE.

Manufacturers of GAS-RETORTS, GLASSHOUSE FURNACE & BLAST-FURNACE BRICKS, LUMPS, TILES, and every description of FIRE-BRICKS.

Proprietors of

BEST GLASSHOUSE POT & CRUCIBLE CLAY.

SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

LONDON OFFICE: R. CULL, 84, OLD BROAD ST., E.C.

HEBBURN MAIN GAS COALS.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·4 candles.
Coke . . . . . 68 per cent.

For Prices, f.o.b. Ship or Delivered by Rail, apply to

THE WALLSEND & HEBBURN COAL COMPANY, LTD.

8 Lombard Street, NEWCASTLE-ON-TYNE.

W. RICHARDSON, Fitter.

THOMAS TURTON AND SONS, LIMITED,

SHEAF WORKS, SHEFFIELD,

MANUFACTURERS OF

FILES OF BEST QUALITY

FOR ENGINEERS.

STEEL OF ALL DESCRIPTIONS.

SCREW STOCKS, TAPS AND DIES, SPANNERS, RATCHET BRACES, LIFTING JACKS, ANVILS, VICES, AND ENGINEERS' TOOLS GENERALLY.

LONDON OFFICE:

90, CANNON STREET, E.C.

Awarded HIGHEST MEDAL and DIPLOMA at the Newcastle-on-Tyne Royal Mining and Industrial Exhibition, 1887, for

CANNEL & COAL.

TYNE

BOGHEAD CANNEL.

Yield of Gas per ton . . . . . 13,155 cub. ft.
Illuminating Power . . . . . 38·22 candles.
Coke per ton . . . . . 1,301·88 lbs.

EAST PONTOP GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 17·8 candles.
Coke . . . . . 70 per cent.

SOUTH PELAW MAIN GAS COAL.

Yield of Gas per ton . . . . . 10,500 cub. ft.
Illuminating Power . . . . . 16·3 candles.
Coke . . . . . 73·1 per cent.

For Prices and complete Analysis, apply to

THOS. W. DANCE & SONS,

COAL OWNERS, NEWCASTLE-ON-TYNE;

OR

E. FOSTER & CO.,

21, JOHN STREET, ADELPHI, LONDON, W.C.

HUNTER'S
OXIDE OF IRON.
JAMES HUNTER, MINER AND SHIPPER OF
NATURAL IRISH BOG ORE.
This Estate yields the finest and most uniform quality in Ireland; and the quality is guaranteed.
Samples and Prices on application.
5, PRINCES STREET, PORT GLASGOW.
Telegrams: "HUNTER, PORT GLASGOW."
Established 1872.

BOLDON GAS COALS.

ANALYSIS.

Yield of Gas per ton .	10,500	Cubic Feet.
Illuminating Power .	16·9	Candles.
Coke	66·7	Coke.
Sulphur	0·86	Sulphur.
Ash	2·04	Ash.

For Prices, &c., apply to
W. H. PARKINSON,
THE HARTON COAL CO., LTD.,
NEWCASTLE-ON-TYNE.
Telegraphic Address: "PARKINSON NEWCASTLE."

STAFFORDSHIRE THE STEEL TUBE CO.
TELEGRAMS:
"EVESON, BIRMINGHAM."

UNEQUALLED.
Gas Companies are solicited to try Samples of the
MIRFIELD
BLACK BED GAS COAL.
Prices and Analysis on application.
MIRFIELD (GAS-COAL) COLLIERY COMPY.
RAVENSTHORPE, NEAR DEWSBURY.

ROBERT MARSHALL,
CANNEL COAL MERCHANT,
97, WELLINGTON STREET, GLASGOW.
Prices and Analysis of all the Scotch Cannels on Application.

THORNLEY GAS COALS
WORKED BY THE
WEARDALE IRON & COAL Co., LD.
OUT OF THEIR
THORNLEY AND WHEATLEY HILL COLLIERIES.

Analysis made by
Messrs. J. & H. S. PATTINSON, *May 28, 1895.*

Yield of Gas per Ton .	10,500 Cub. Ft.
Illuminating Power .	16·9 Candles.
Coke (of good quality) .	67·5 per Cent.
Sulphur	0·58 "
Ash	2·73 "

For Price, &c., apply to the
WEARDALE IRON & COAL Co., LD.
QUAYSIDE, NEWCASTLE-ON-TYNE.

Price 7s. 6d. per 100; £3 *per* 1000 (*Carriage Free*), *Demy 4to.*,
A LEAFLET ON
SULPHATE OF AMMONIA:
ITS SOURCE—RELATIONSHIP TO SOIL—EFFECT ON PLANTS.
BY
H. H. COUSINS, M.A., South-Eastern Agricultural College, Wye.
London: WALTER KING, 11, Bolt Court, Fleet St., E.C.

BOWENS' Ltd. Successors,
STOURBRIDGE.
MANUFACTURERS OF
BEST FIRE-BRICKS; INCLINED, HORIZONTAL, and SECTIONAL RETORTS; LUMPS, TILES, &c., of every description.
Established 1860.

ALDER AND MACKAY,
MANUFACTURERS OF
IMPROVED WET AND DRY GAS-METERS
IN CAST-IRON AND TIN CASES OF THE HIGHEST EXCELLENCE.
ORIGINAL MANUFACTURERS OF DRY METERS IN CAST-IRON CASES.
STATION METERS, EXPERIMENTAL METERS, PHOTOMETERS, & PRESSURE-GAUGES, &c.

Results of Tests of Dry Gas-Meters (Section III.) of the Glasgow Philosophical Society's Gas Exhibition, as per London "Gas Journal," May 10, 1881.

	ALDER & MACKAY.	W. & B. COWAN.	G. GLOVER & Co.	JAMES KEITH.	D. B. PEEBLES & Co.
Total of Fast Tests .	47·2	6·9	33 6	62·3	53·7
Total of Slow Tests .	25·3	117·4	43·1	31·4	38·5
	72·5	124·3	76·7	93·7	92·2

Descriptive Circulars, Price Lists, and Full Particulars forwarded on application.
NEW GRANGE WORKS, EDINBURGH.

W. J. JENKINS & CO.,
MOUTHPIECES
WITH SELF-SEALING LIDS FOR
HORIZONTAL AND INCLINED RETORTS.
RETFORD.

W. C. HOLMES & CO.

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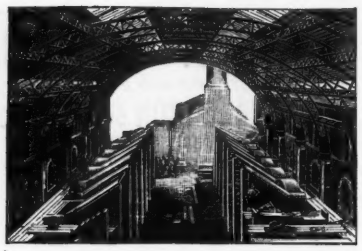

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GAS & CHEMICAL
PLANT.

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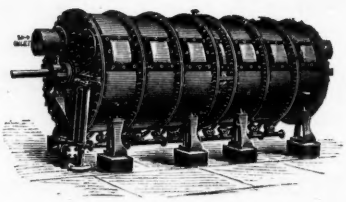
"HOLMES, HUDDERSFIELD."

Improved
PATENT SCRUBBER-WASHERS,
All sizes,
From 50,000 to 5,000,000 Cubic Feet of Gas per day.
Results unrivalled. Send for Particulars and Prices.

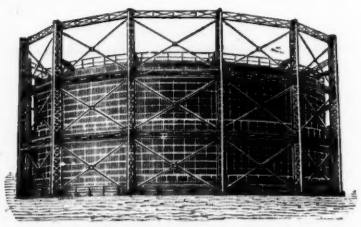
MALLEABLE
and all Kinds of
CASTINGS.



GASHOLDERS of Improved Construction and of all Sizes.
ROOFS, BRIDGES, TANKS, GIRDERS.

Improved
BYE-PASS and
CENTRE-VALVES,
GOVERNORS,
and METERS.

Rotary or Pump
EXHAUSTERS.



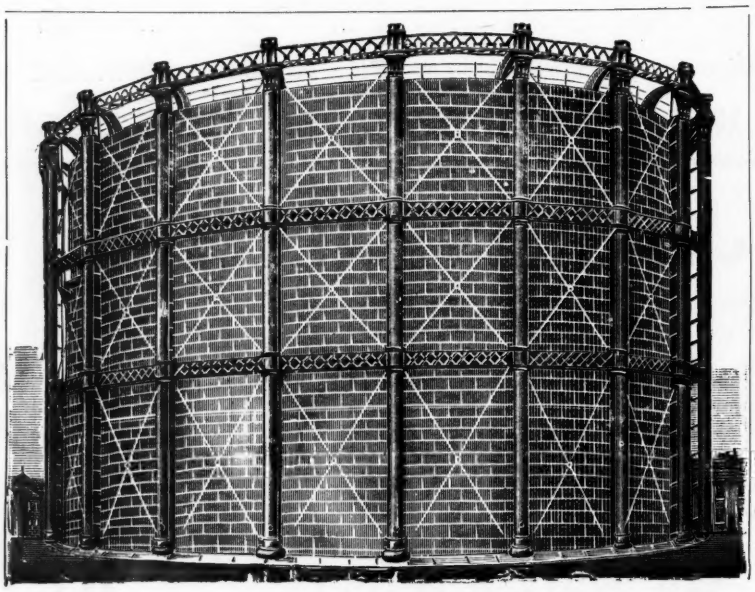
80, CANNON STREET, LONDON,
AND
WHITESTONE IRON WORKS, HUDDERSFIELD.

THE HORSELEY CO., LTD., TIPTON, STAFFORDSHIRE.

MAKERS OF **GASHOLDERS & GAS PLANT,**

PURIFIERS, SCRUBBERS, CONDENSERS, WASHERS, TANKS, VALVES,
PIPES, LAMP PILLARS, RETORT-FITTINGS, ETC.

ALSO ALL KINDS OF
STRUCTURAL IRON
AND STEEL WORK.
BRIDGES,
ROOFS
PIERS, ETC.



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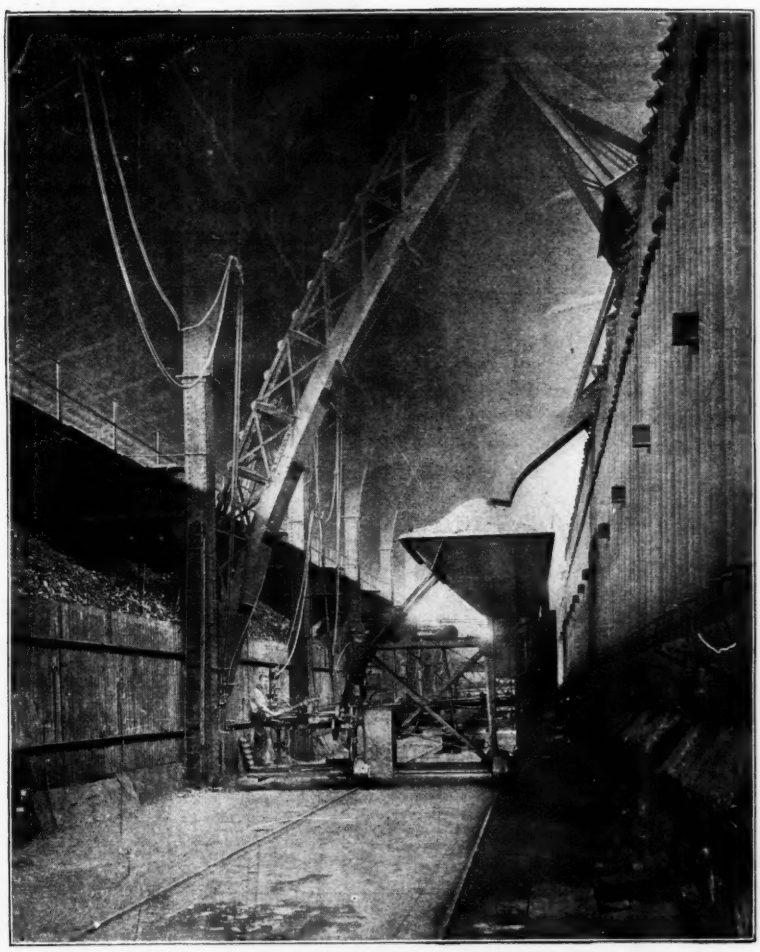

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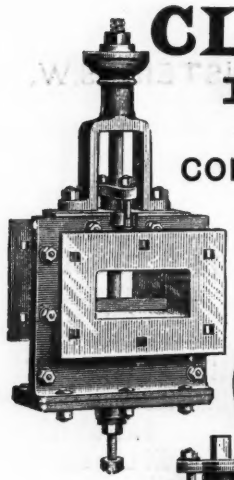
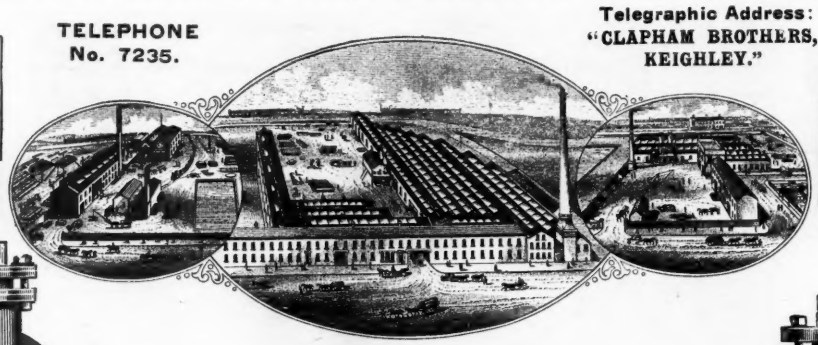
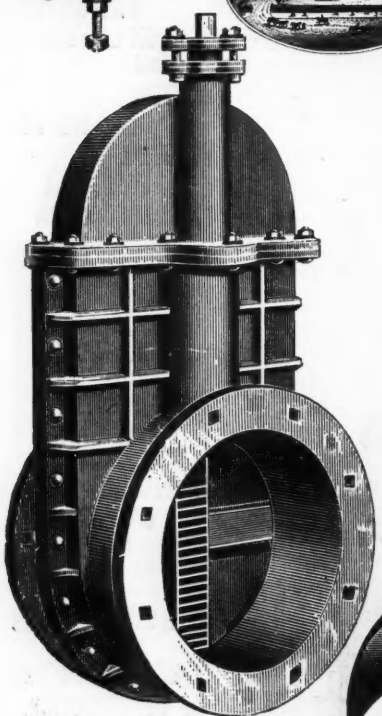
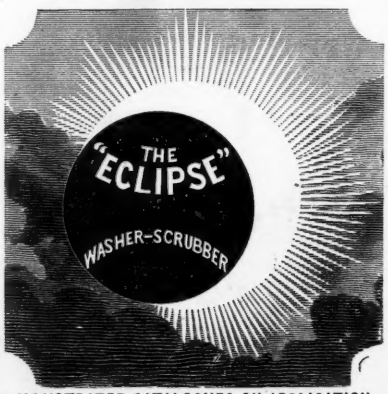


TELEPHONE No. 7235.

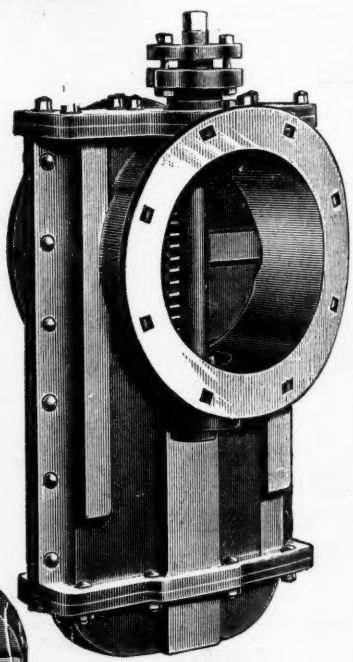
Telegraphic Address: "CLAPHAM BROTHERS, KEIGHLEY."

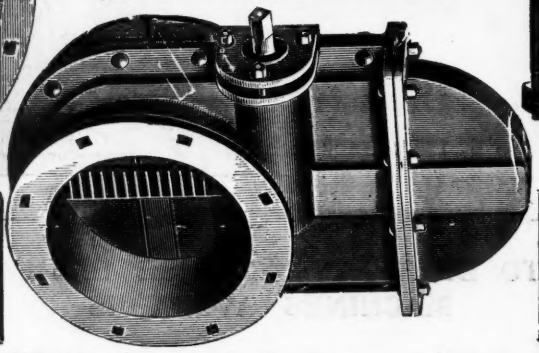






ILLUSTRATED CATALOGUES ON APPLICATION.





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